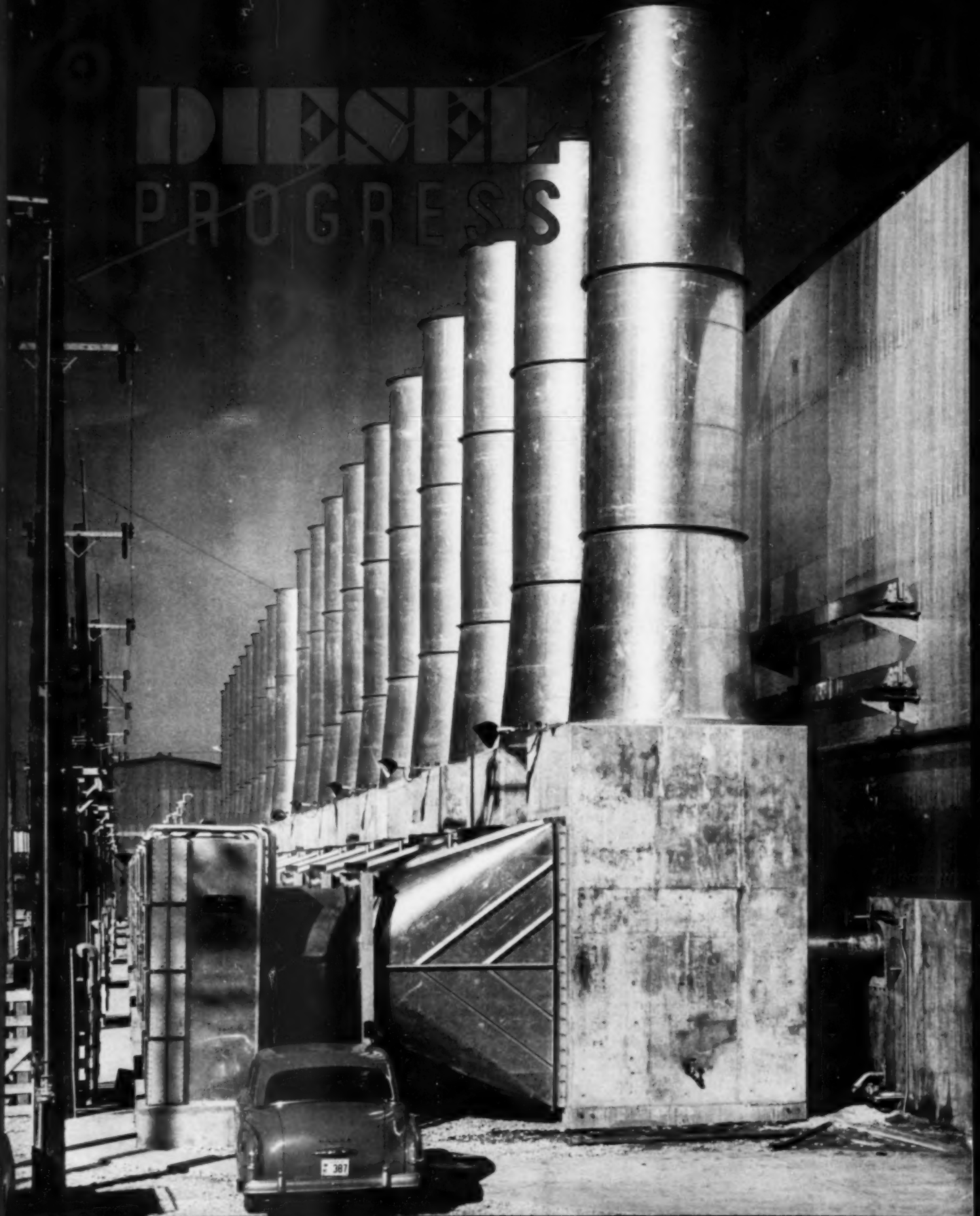


# DIESEL PROGRESS



FIVE DOLLARS PER YEAR

FEBRUARY, 1952

FIFTY CENTS PER COPY

# LESS fuel used

# LESS maintenance cost

...when you use  
**TEXACO URSA OIL**

**T**HIS is a proven fact: Diesel, gas and dual-fuel engines all run cleaner, use less fuel, require less maintenance expense when lubricated with *Texaco Ursa Oil*. The reasons why are these —

*Texaco Ursa Oil* stands up under heat and pressure, resists oxidation. This means freedom from carbon, varnish, sludge. It means free rings for better compression and combustion, real savings in fuel. Wear is reduced, bearings and all moving

parts last longer.

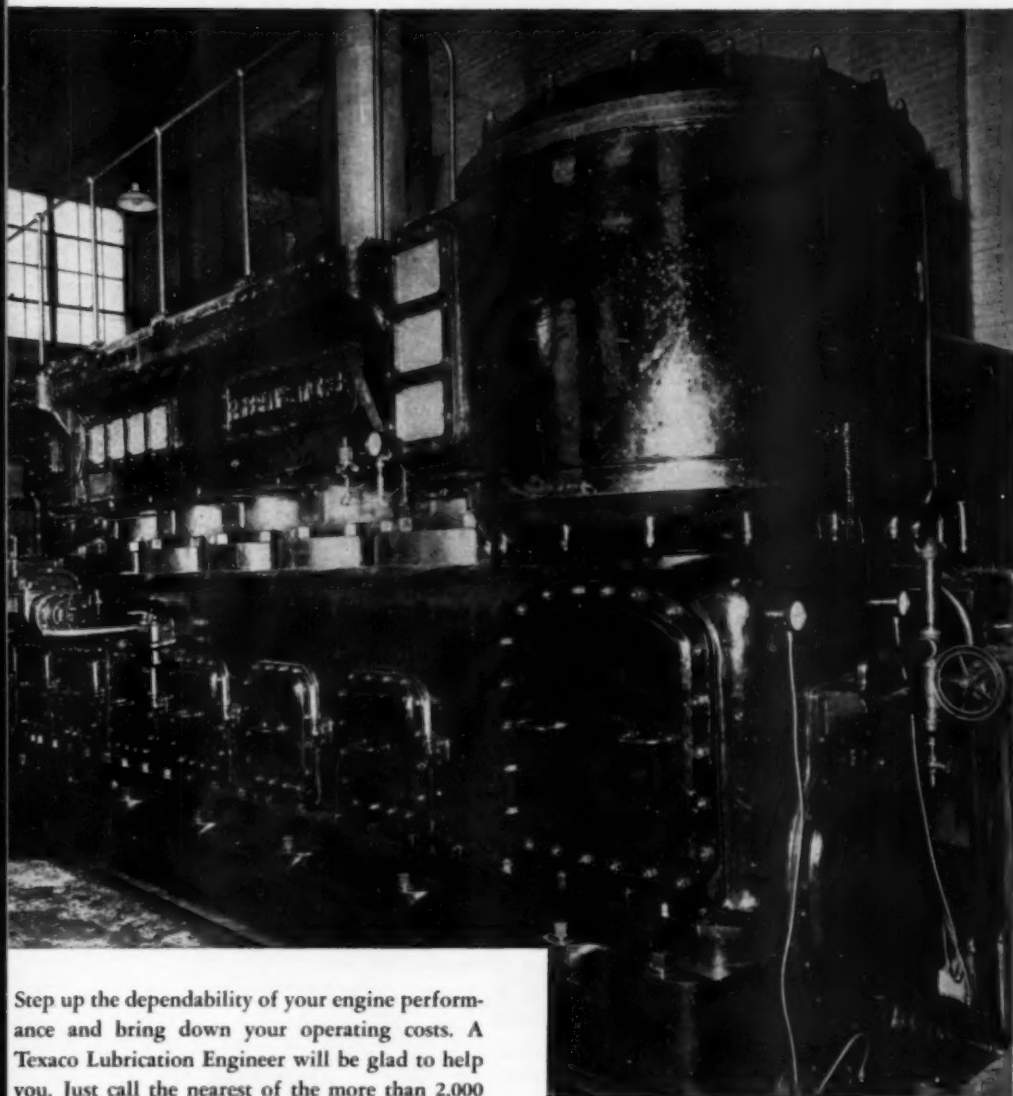
There is a complete line of *Texaco Ursa Oils* to meet the requirements of every stationary Diesel engine and every set of operating conditions. They have the O.K. of leading engine builders and operators everywhere. In fact —

*For over 15 years, more stationary Diesel h.p. in the U. S. has been lubricated with Texaco Ursa Oil than with any other brand.*

**TUNE IN . . . TEXACO  
STAR THEATER**  
starring MILTON BERLE  
on television  
every Tuesday night.  
METROPOLITAN OPERA  
radio broadcasts every  
Saturday afternoon.



# TEXACO



Step up the dependability of your engine performance and bring down your operating costs. A Texaco Lubrication Engineer will be glad to help you. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

**URSA OILS FOR ALL DIESEL, GAS AND DUAL-FUEL ENGINES**

*Faithfully yours*  
**50**  
*for Fifty Years*



**MADISON**

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ESTABLISHED 1898

**MANUFACTURING**

. . . DIE CASTINGS AND  
COMPLETELY MACHINED COMPONENTS,  
LUBRICATORS • HIGH SPEED AIR GRINDERS

An outstanding feature of the history of Madison-Kipp is the consistency of its services to the same customers year after year for 10, 20, 30 or more.

It has really been a case of being "departmentalized" into the organizations we serve.

This is a type of inter-company relationship that may be especially valuable to you in the near future and for years to come.

## **MADISON-KIPP CORPORATION**

215 WAUBESA STREET, MADISON 10, WIS., U.S.A.

ANCIENS ATELIERS GASQUY, 31 Rue du Marais, Brussels, Belgium, sole agents for Belgium, Holland, France, and Switzerland.

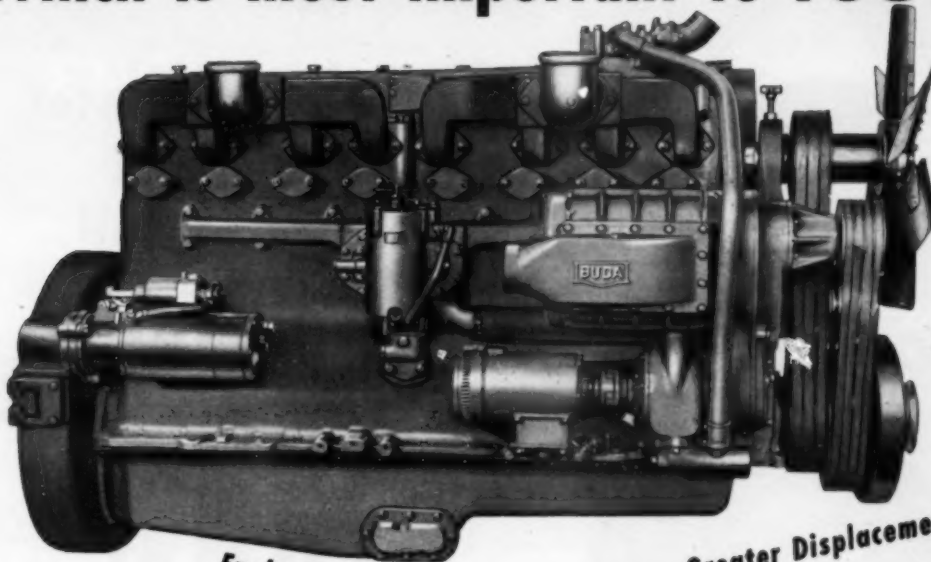
WM. COULTHARD & CO. Ltd., Carlisle, England, sole agents for England, most European countries, India, Australia, and New Zealand.



- Skilled in DIE CASTING Mechanics
- Experienced in LUBRICATION Engineering
- Originators of Really High Speed AIR TOOLS



# Which is most important to YOU?



## Fuel Economy

Buda dyna-swirl combustion burns all the fuel—gives more horsepower hours per gallon

## Less Maintenance and Downtime

"Clean" design—fewer parts—lower peak pressures...and Simple fuel system means less "nick-nack" maintenance

## Parts and Service

Buda Parts and Service Facilities close to your operations

## More Power—Greater Displacement

Buda Diesels have 13 to 25% more displacement—more power with greater reserve

## Greater Lugging Ability...

## More Torque

You get 10 to 17% more torque at normal speeds—less shifting—faster trips

## Longer Life... More Hours between Overhauls

Buda Diesels are averaging more than 6000 hrs. in toughest service



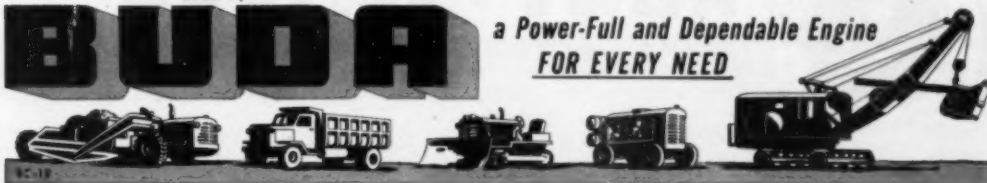
## If it means MORE PROFITS... BUDA'S GOT IT!

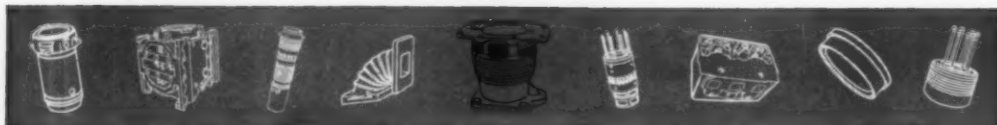
Any way you figure it... the great new line of Buda dyna-swirl Diesels gives you more for your power dollar—more positive advantages that add up to profitable operation.

Get the facts today. They speak for themselves. Ask your nearby Buda Engine Distributor. Write for Bulletin 1526 and complete details. *The Buda Company, Harvey, Illinois.*

# BUDA

*a Power-Full and Dependable Engine  
FOR EVERY NEED*





## An Air Compressor Cylinder of NEW DESIGN

# GUN IRON

The combination of Gun Iron and Hunt-Spiller engineering and manufacturing abilities has contributed greatly to modern diesel performance. The introduction of this new line of replacement cylinders for the most popular types of diesel locomotive air compressors is another example of Hunt-Spiller leadership in this field.

These are the important features of this new product:

- By design refinements and casting techniques, approximately 42% has been added to the area of the heat-radiating fins. This area has been concentrated at the head-end of the cylinders where greatest heat dissipation is required. Preliminary tests indicate that these cylinders operate at a marked reduction in temperature.
- Cast of Hunt-Spiller's fine grained, dense-structure Gun Iron, HSGI cylinders provide long life and even-wearing qualities.

For many of your diesel parts which are subjected to frictional wear, heat, pressure or erosion, Gun Iron offers desirable physical properties found in no other material. We'll be glad to supply you with full information on Gun Iron and its specific application to your requirements.



## HUNT • SPILLER

### MANUFACTURING CORPORATION

387 DORCHESTER AVENUE • SOUTH BOSTON 27, MASS.

Canadian Representatives: Joseph Robb & Co., Ltd., 4050 Namur St., Montreal 16, P. Q.

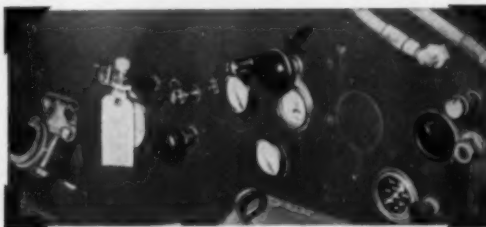
# STANDARD ENGINEER'S REPORT

PRODUCT	Chevron Starting Fluid
UNITS	Diesel engines
CONDITIONS	Sub-zero temps high altitudes
EQUIPMENT	Permanent primers with atomizers on manifolds
FIRM	The Utah Construction Co. Cedar City, Utah

## Four hours saved daily starting 13 diesels!



TRUCKS LIKE THIS, when primed with Chevron Starting Fluid last winter, averaged only a minute and a half starting time in temperatures down to 26° below zero. Previously, it took 20 minutes to start each of the 13 units operated by the Utah Construction Co. at



mile-high Cedar City, Utah. This meant a saving of four hours a day in starting time alone. A dash-mounted pump (arrow) in each unit forces Chevron Starting Fluid through atomizers into the manifold and primes the engine for fast starting.



STORAGE TANK for bulk Chevron Starting Fluid is here mounted near the engine. The fluid also comes in 7- and 17-CC gelatin capsules. These capsules are placed in a puncturing tool and fluid is pumped into intake manifold the same way as from the central bulk tank shown. Each type of dispensing equipment is suitable for both diesel and gasoline engines and is available from your starting fluid supplier. Chevron Starting Fluid is approved by leading engine manufacturers.

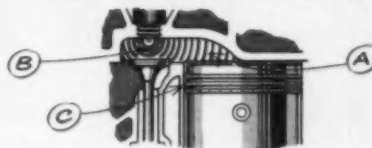


FREE BOOKLET gives you more facts on Chevron Starting Fluid—shows where it should be applied in different type engines. Write or ask for it today.



TRADEMARK REG. U.S. PAT. OFF.

### How CHEVRON Starting Fluid Starts Gasoline and Diesel Engines Instantly



- A. Atomizes in lowest temperatures and provides powerful, easily ignited vapor in combustion chamber.
- B. Pressure, or the weakest spark, fires mixture—turns engine and heats air for regular fuel mixture.
- C. Contains lubricant and additives—inhibits cylinder wear and ice formation in primer equipment.

FOR MORE INFORMATION about this or other petroleum products of any kind, or the name of your nearest distributor handling them, write or call any of the companies listed below.

STANDARD OIL COMPANY OF CALIFORNIA  
725 Bush Street • San Francisco 30, California

THE CALIFORNIA COMPANY  
P. O. Box 780 • Denver 1, Colorado

STANDARD OIL COMPANY OF TEXAS  
P. O. Box 862 • El Paso, Texas

# *Alnor* PROTECTION

for KAISER POWER PLANT



The new Kaiser aluminum plant in Chalmette, Louisiana, is huge by every measure—35 acres of floor space . . . 150,000 h.p. diesel power plant . . . 46,000 lbs. of aluminum produced every hour . . . 24 hours a day.

Here, as at Alcoa's plant, the new Nordberg radial engine is used—80 units in all. Each engine is rated at 1820 h.p. . . each engine works up a heat load of nearly 3,000,000 b.t.u.'s an hour—that calls for protection. And, like the Alcoa installation, that protection is supplied by the latest in protective equipment—the Alnor Pyrotac.

This precision-built instrument continuously monitors exhaust temperatures . . . automatically checks each cylinder every minute. Watching the pyrometer scale from as far away as 20 feet, you can instantly tell if any one cylinder is out of balance . . . allows supervision by a minimum force. The instrument can be wired to an alarm circuit to warn of excess temperatures and automatically shut down the engine when maximum safe temperatures are exceeded.

Such automatic, constant protection reduces maintenance time and expense to a minimum—increases efficiency and operating economy.

The Pyrotac presents many opportunities for improved instrumentation in the diesel and gas engine field. It can be used to warn of excess temperatures in cylinders, entire engines, overheated bearings, burn-out danger in fields of large generators, etc. Why not ask for Alnor assistance in solving your pyrometer problems today? Illinois Testing Laboratories, Inc., Room 508, 420 N. La Salle St., Chicago 10, Ill.

## *Alnor*

**PRECISION INSTRUMENTS  
FOR EVERY INDUSTRY**





Julia C. Moran. New 106' Diesel-Electric tug designed by Tams, Inc., and built by Jacobson's Shipyard, Oyster Bay, L. I. Powered by a General Motors Model 16-278A Diesel developing 1750 H.P.

## 39th in a Famous Fleet!

Latest addition to the world's largest and busiest tug fleet is the Julia C. Moran — 39th General Motors Diesel-powered vessel commissioned by the Moran Towing & Transportation Co., since the start of its big

modernization program in 1937. Continued preference by the world's largest operators speaks volumes for the efficient, economical performance of this modern Diesel-Electric power for every type of service.

*No Substitute for Diesel-Electric Drive*

## Cleveland Diesel Engine Division

GENERAL MOTORS • CLEVELAND 11, OHIO

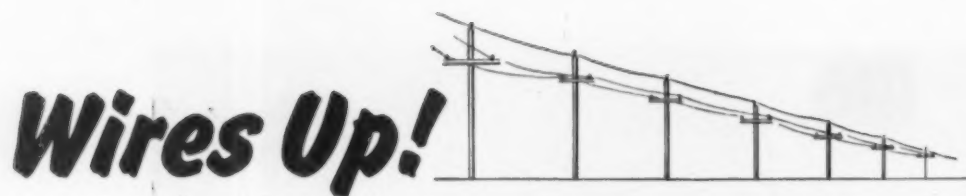


ENGINES FROM 150 TO 2000 H. P.

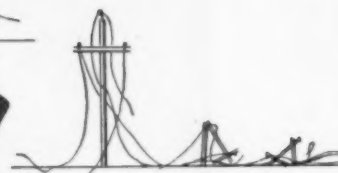
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San Francisco, Calif. • Seattle, Wash. • St. Louis, Mo. • Tampa, Fla. • Toronto, Ont. • Vancouver, B. C. • Washington, D. C. • Wilmington, Calif.

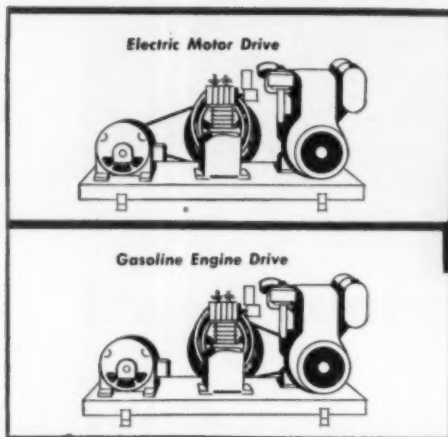
# **Wires Up!**



# **or Wires Down!**



**... you'll have starting air on tap  
with this compressor outfit**



Both electric motor and gasoline engine drive are furnished with this Gardner-Denver ADD Compressor combination. Normally, you'll use the electric motor—but whenever power emergencies come along, you can simply switch the V-belt drive to the gasoline engine, and still have the air you need for diesel engine

starting. This combination is ideal, too, for the portable diesel rig that's sometimes set up beyond the reach of power lines.

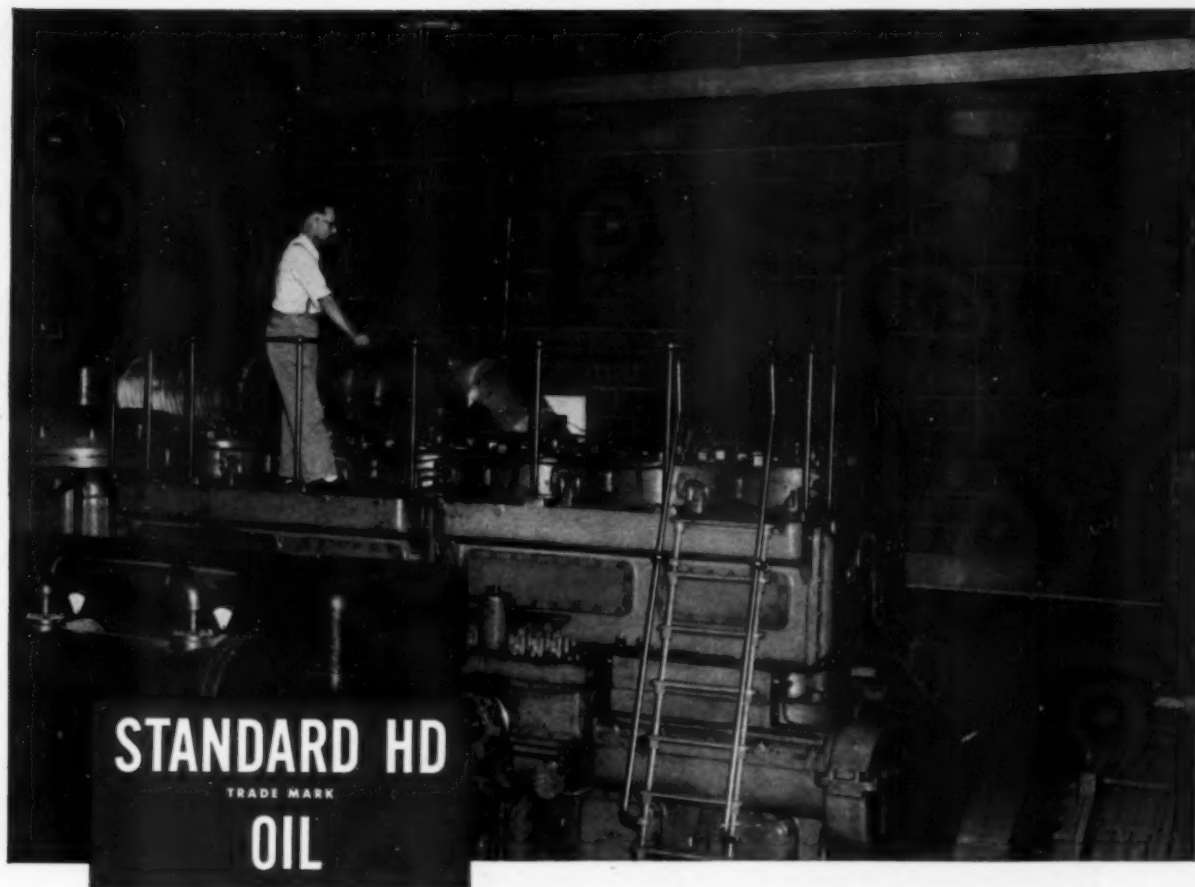
Write today for full information on this and other quality Gardner-Denver Air Compressors for engine starting service.

## **GARDNER-DENVER**

### **SINCE 1859**

Gardner-Denver Company, Quincy, Illinois

**THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS**



## STANDARD HD TRADE MARK OIL

### Doubles time between overhauls

• In the case of this 1028 HP diesel serving a midwestern municipal power station, excessive operating and maintenance costs were a serious problem . . . until a Standard Oil lubrication specialist recommended changing to STANDARD HD Oil and STANDARD Diesel Fuel.

Here's the situation today, in comparison with the results which plant operators were getting with a conventional lubricant:

Ring sticking, ring breakage, and car-

bon deposits have been eliminated.

Ring replacements have been reduced from 80 to 18 per year. Cylinder wear has been cut from .003" per 1000 hours to a maximum of .003" per 5000 hours.

Time between overhauls has been extended from 2500 hours to 6000 hours and longer.

Lubricant consumption, formerly averaging one gallon per 1192 KW generated, now averages one gallon per 1535 KW generated. Fuel con-

sumption, which had averaged 12.28 KW per gallon, now averages 13.50 KW per gallon.

A Standard Oil lubrication specialist can help you develop a similar "before and after" situation in the operation of your own diesels. For his services, and his recommendations, simply call the Standard Oil Company office in your own area. Or write:

Standard Oil Company (Indiana), 910 S. Michigan Ave., Chicago 80, Illinois.

**STANDARD OIL COMPANY**



(Indiana)

# KAISER ALUMINUM

## Uses AAF Filters As "Power Protection"



▲ 8-Unit Type PL-H Amer-Aire Intake Filter, one of which serves each of the eighty engines.

◀ View of main power plant showing portion of the 80 Nordberg Radial-Type Gas Engines.

### New Chalmette, La., Reduction Plant Goes into Production with Clean Air Assured for 80 Radial-Type Gas Engines

"Heart" of the Kaiser Aluminum & Chemical Corporation's new aluminum reduction plant is this power station where 80 Nordberg Radial-Type Gas Engines drive a like number of generators. Supplying clean air for these engines imposes exacting demands on the filters. The very handling of the fine alumina powder creates a dust problem of major proportions. Added to this, you have a climate where excessive moisture is most common.

The filters selected for the job—eighty 8-unit Type PL-H Amer-Aire Intake Filters. This

dry-type filter, featuring disposable Airmat filtering media, is particularly effective in cleaning air containing both excessive moisture and a high volume of fine dust.

This is the second large Gulf Coast aluminum plant where Amer-Aire Intake Filters have been installed on the engines. The reason—a complete line of filters to meet every need, whose effective design and performance have been proved in fact as well as theory. A mighty good reason why you should specify the "power protection" of AAF Amer-Aire Intake Filters.

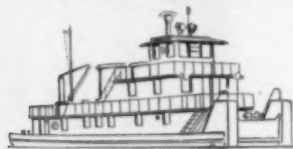
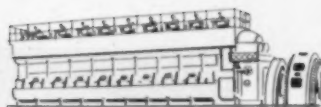


# American Air Filter

COMPANY, INC.

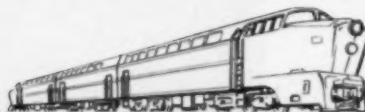
408 Central Avenue, Louisville 8, Kentucky • American Air Filter of Canada, Ltd., Montreal, P. Q.





# Gulf Dieselmotive Oil

**cuts maintenance costs for industrial, workboat and railroad Diesels**



## Here's why:

- ▶ Effective detergent action—Keeps rings clean
- ▶ 100% solvent-refined oil
- ▶ Does not form hard metal-like deposits on piston crowns
- ▶ Oxidation inhibited—resists sludging
- ▶ Nonfoaming

Here is the oil that provides protection plus for industrial, workboat, and railway Diesels—Gulf Dieselmotive Oil.

Made from 100% solvent-refined oil, it does not form harmful metal-like deposits on piston crowns, especially important where the same oil is in service for a long period of time.

Gulf Dieselmotive Oil has effective detergent-dispersant action, which helps keep oil-control and compression rings clean and free, and retards sludge formation. As a result, wear and oil consumption are remarkably low.

Containing an excellent oxidation inhibitor, Gulf Dieselmotive Oil has outstanding resistance to oxidation and the formation of crankcase sludge. It's nonfoaming and noncorrosive to silver bearings.

These advantages of Gulf Dieselmotive Oil add

up to cleaner engines, reduced cylinder wear, and lower maintenance costs.

For further information call in a Gulf Lubrication Engineer today. Write, wire, or phone your nearest Gulf office.

Gulf Oil Corporation • Gulf Refining Company,  
Gulf Building, Pittsburgh 30, Pennsylvania.



# They like things

In booming Texas they're thinking way ahead—intelligently planning for future load growth. At Robstown, for instance, city fathers will soon accept delivery of a big 6-cylinder, 2900 hp Hamilton engine that will provide plenty of power for future needs.

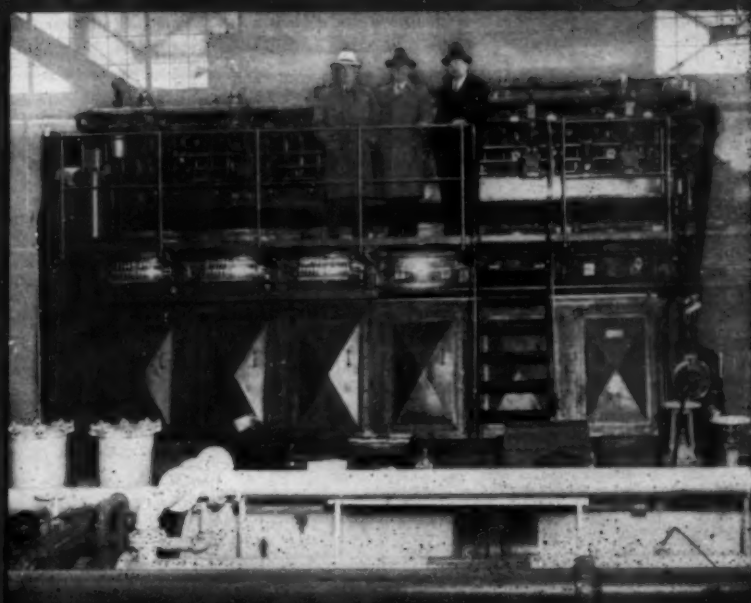
A dual-fuel unit, this 21 $\frac{1}{4}$  x 27 $\frac{1}{2}$  engine burns either gas or the heaviest diesel fuel with equal efficiency. And it has all those other features which have made the Hamilton Model 21-DA one of the few large diesels completely re-engineered since the war—so outstanding in performance.

**SQUISH ACTION!** Important secret of this superior performance is Squish Action—a better way to use fuel. Because of exclusive spray valve design, an umbrella wall chamber, proportioned porting and a semi-hemispherical combustion chamber—40% more air is trapped in the cylinder. Then forced into the fuel spray cone just as the piston reaches top dead center.

The result . . . for better efficiencies in fuel consumption . . . more power . . . less engine wear . . . less maintenance . . . a cleaner, cooler exhaust.

**WRITE!** If you are looking for marine or stationary diesel, remember there's a conservatively rated Hamilton or Baldwin-De La Vergne unit for virtually any job in the slow and medium speed range from 550 to 6860 hp. Why not write today.





"Extremely Impressed" were the men behind (Center) West International and Chief Engineer of Robstown, Texas, at the exhibition in fact and pilot off on down by the Robstown engine during a test at Hamilton, Ohio, shown John G. Miller, Hamilton representative in Texas and Oscar E. Smith, Hamilton Department of Service.



LIMA-HAMILTON DIVISION • BALDWIN-LIMA-HAMILTON CORPORATION • HAMILTON, OHIO  
**BALDWIN-LIMA-HAMILTON**

# DIESEL ENGINE CATALOG

# NOW

# READY!

## ENTIRELY REVISED AND REWRITTEN!

### VOLUME SIXTEEN ENGINES LISTED AND DESCRIBED IN VOLUME 16

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### VOLUME SIXTEEN

*A MUST for design and operating  
Engineers! Indispensable for Buyers!  
Invaluable to Instructors and Students!*

IN NO OTHER BOOK can be found such complete and detailed information on diesel engines and accessories. Rewritten in its entirety while being brought up-to-date, great attention has been given to make Diesel Engine Catalog an easy-to-read book. Its comprehensive classification and indexing all contribute to making any item easy-to-find.

FIVE BOOKS IN ONE, HAVING FIVE INTEGRAL SECTIONS, this catalog is indispensable whether for technical reference or selective buying:

- (a) An engine section fully illustrated with complete technical descriptions and specifications.
- (b) An accessory section describing engine and plant accessories.
- (c) A transmission section describing torque converters, etc.
- (d) A classified buyers' guide—"Market Place," covering diesels, accessories, transmissions and other allied products.
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**MAKE SURE THE INFORMATION AT HAND IS ACCURATE AND  
UP-TO-DATE!**

**EVERY EDITION A SELL-OUT!**

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**DIESEL PROGRESS**

P.O. Box 8458, Cole Station  
Los Angeles 46, Calif.

Enter my order today for a copy of the Diesel Engine Catalog, Volume Sixteen, Edited by Rex W. Wadman, for which I enclose \$10.00. (Copies may be ordered in Sterling areas by remitting £4:0:0 to E. H. Doddrell, 342 St. Paul's Corner, Ludgate Hill, London, E.C.4.)

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ADDRESS.....

CITY.....ZONE.....STATE.....  
(PLEASE PRINT)

**ORDER YOUR COPY TODAY! ➡**

FEBR





Operating floor of engine room for one of the two operating pot lines houses 40 Nordberg radial gas engines each driving a G-E 1290-Kw, 725-volt, vertical generator. Generators are installed directly under each gas engine and are mounted in housings that enclose the generators and support the engines.

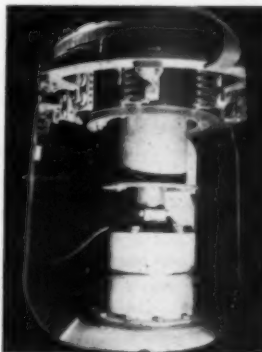
## Co-ordinated electric system will help give new Kaiser plant yield of 46,000 lbs/hr

**First pot line of new plant goes on line; G-E generators and associated equipment furnish d-c power needed in reduction process**

Kaiser Aluminum and Chemical Corp.'s new Chalmette, La. reduction plant has just begun production on one of its eight pot lines. The first two lines, with an output of 100,000,000 lbs./year, are served by 80 1820-hp gas engines, each driving a General Electric d-c generator.

Electric power for the other six lines will be provided by 14 G-E steam turbine-generators and rectifier facilities for conversion to d-c.

Co-ordinated throughout, this installation is further proof that G.E.'s complete line of electric equipment can meet all your industry's electric needs, with G-E engineers to help apply it most economically. Ask your nearest G-E office about it—*early* in your planning. General Electric Co., Schenectady 5, N. Y.



View inside one of the generator housings. Forty such slow-speed generators, driven directly from the engines, develop 70,000 amps at 725 volts. Each is equipped with a G-E high-speed, reverse-current trip circuit breaker for protection against feed-back on fault.



Each engine is controlled by a G-E custom-built operator's panel. All starting, automatic alarm and shut down, and accessory control is handled through these panels. When engine is running, it is switched to a master control panel where it is brought under load.

**GENERAL**  **ELECTRIC**

680-24

**"... helping to keep  
the business cycle  
on an even keel ..."**



**HARRY B. HIGGINS**  
President, Pittsburgh Plate Glass Company

*"The employees of Pittsburgh Plate Glass Company since 1946, have purchased \$9,488,510 in United States Savings Bonds through the Payroll Savings Plan. This accumulation of assets will be of inestimable value in helping to keep the business cycle on an even keel by maintaining purchasing power for the future."*

Payroll Savings—the plan that protects—pays the employer triple benefits:

- it makes a good employee a better one—a serious saver with a definite plan for personal security.
- as enrollment on the plan goes to 60%, 70% employee participation, productivity increases, absenteeism decreases and accident records go down.
- and as Mr. Higgins points out, the systematic purchase of Defense Bonds through the Payroll Savings Plan is building a tremendous reserve of purchasing power.

Let's point up the third employer benefit with a few figures:

- On September 30, 1951, individuals held Series E Bonds totaling \$34.6 Billion—more than \$4.6 greater than on V-J Day.
- During the five calendar years (1946-1950) Defense Bonds sales provided:

—Cash to retire \$3 Billion A-D Savings Bonds (maturing Series).

—Cash to meet \$24 Billion redemptions of E, F and G Bonds.

—\$6 Billion (after providing cash for the payments enumerated above) that the U.S. Treasury could use to pay off bank-held debt.

And the figures are getting better every day—between January 1, 1951 and November 1, 1951, 1,200,000 employed men and women joined the Payroll Savings Plan.

If the employee participation on your Payroll Savings Plan is less than 60%, phone, wire or write to Savings Bond Division, U.S. Treasury Department, Suite 700, Washington Building, Washington, D.C. Your State Director will be glad to show you how you can participate in the triple benefits of the Payroll Savings Plan.

*The U.S. Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and*

*Rex H. Hademan*

Editor—DIESEL PROGRESS





*Drawn above is a magnified view of two drops of Diesel lubricating oil taken from two new Diesel engines.*

## **Which is the better diesel oil?**

Chances are, you'd pick the clear clean oil on the right as the better oil . . . but you'd be wrong.

The clean oil is the "lazy" non-detergent oil. It has done a job of lubricating, but it has not done a proper cleaning job.

The better oil is the dirty oil. Its job has been well done. Not only did it provide complete, protective lubrication, but it actually washed the engine! . . . carrying out of the engine those microscopic, insoluble particles that would normally form harmful incrustations on vital engine parts.

The oil holding the dirt particles in suspension is Cities Service D-C 300 . . . one of the complete line of Cities Service Diesel Engine Oils. Its detergent-dispersant and anti-oxidation qualities assure longer, more trouble-free Diesel operation. This high V. I. heavy duty oil guarantees complete lubrication protection at highest engine speeds.

Why not discuss your operation with a Cities Service Lubrication Engineer. His experience and the complete line of scientifically-formulated Diesel lubricants can mean improved operating conditions for you. Write to CITIES SERVICE OIL COMPANY, Dept. B 13, Sixty Wall Tower, New York City 5 . . . or call the Cities Service Office nearest you.

**CITIES  SERVICE**  
QUALITY PETROLEUM PRODUCTS

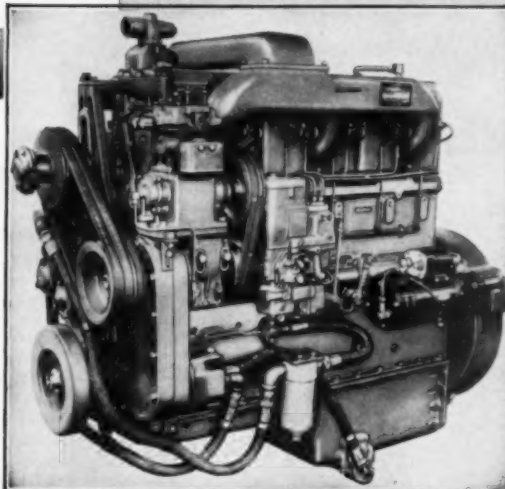
# FLEXIBLE HOSE LINES

WITH DETACHABLE,  
REUSABLE FITTINGS



Always first  
ON DIESEL ENGINES

Save time, save money and reduce inventory by putting the "Aeroquip Idea" to work for you. With Aeroquip you make your own flexible hose assemblies by cutting bulk hose to desired lengths and attaching Aeroquip Reusable Fittings. Assembly can be accomplished quickly and easily right on the job. No special tools are required. No training is needed. Aeroquip high quality Flexible Hose Lines improve performance and reduce maintenance. They eliminate leaks due to vibration and operate dependably at extremely high or low temperatures. They are widely used for hydraulic fluid, water, air, lubricating oils, gas and Diesel fuels and many other fluids.



*Always first*

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Because this Diesel Engine is plumbed with Aeroquip Flexible Hose Lines, replacement of any fluid-carrying line can be accomplished in a fraction of the time required for forming and fitting rigid tubing. Aeroquip Hose Lines are fire resistant and eliminate failures due to vibration.

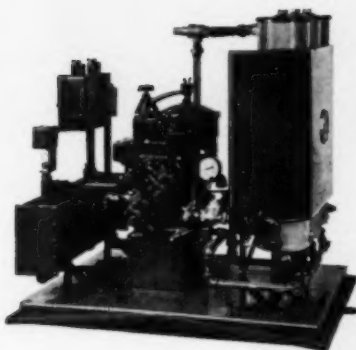
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AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U.S.A. AND ABROAD



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**THE DE LAVAL "PURI-FILTER"**



*Note these Features*

- Removes dirt and water by centrifugal force
- Filters out harmful carbon
- Does not remove valuable additives
- Cleans oil at moderate temperature
- Speeds up inspection—crankcase is cleaner
- Minimizes ring sticking
- Increases bearing life
- Saves labor—long runs without bowl cleaning
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To remove all three major contaminants of diesel lubricating oil, use the De Laval "Puri-Filter." The first two troublemakers—dirt and water—are separated from the oil by centrifugal force. The dirt is stored against the periphery of the bowl where it can not again mix with the oil, and the water is discharged continuously to waste. The third contaminant—colloidal carbon—is filtered out of the purified oil by Fram Filters.

This combination of a De Laval "Uni-Matic" Oil Purifier and a Fram "Filcron" Filter is a completely piped-up unit that is so effective that it gets rid of all solid impurities down to approximately one micron in size. It is by all odds the most effective means ever devised for protecting diesel engine bearings.

Bulletin DL-1 gives additional details. Write for your copy.

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**OIL PURIFIERS**

**FOR DIESEL LUBRICATING OIL**

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2-CYCLE

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**ALL!**



● Think how that cuts your costs . . . simplifies parts stocking . . . speeds up service. 80% of *all* parts fit *all* P&H Diesels—1, 2, 3, 4, and 6-cylinder models. For example, the standard cylinder and liner assembly can be replaced in *any* P&H Diesel in only 40 minutes. You don't even drop the pan. Greater interchangeability is one more reason you should standardize on P&H Diesels. Available in bare engines, power units and generator sets. Write for literature, Diesel Division, Harnischfeger Corporation, Crystal Lake, Illinois.

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CRYSTAL LAKE ILLINOIS, U.S.A.



WORTHINGTON SUPERCHARGED DIESEL ENGINE at Kalamazoo Paper Co., Kalamazoo, Michigan, driving 600-kw generator.

## Kalamazoo Paper Co. guards against costly shutdowns with heavy-duty diesel generator

*Company installs Worthington supercharged diesel and 600-kw generator for stand-by*

An insurance policy against costly shutdowns! Such is the attitude of Kalamazoo Paper Company management towards the Worthington medium-speed, heavy-duty diesel they've installed for stand-by service.

Reason for their choice of this large heavy-duty unit was the reputation for absolute dependability that has been built up for these rugged Worthington engines over a period of years.

Let's look at some of the time-tested features that insure this dependability:

1. Heavy cast-iron base and frame.

2. Steel forged crankshaft bedded in base.

3. Gear-driven camshaft.

4. Metal-to-metal fit between cylinder heads and liners.

5. Main bearings lubricated at bottom where pressure is greatest.

6. 4-bolt connecting-rod bearing assembly.

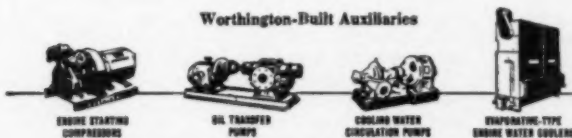
An insurance policy can be no better than the company that backs it. That's why before you buy, it will pay you to look carefully into the manufacturer's reputation.

It is by serving customers such as Kalamazoo that Worthington through the years has built a reputation for manufacturing long-lived, dependable equipment—a reputation that is backed in the heavy diesel field by the longest experience of any manufacturer of this type of equipment.

Feel free to call on Worthington for further details on diesel performance. We can meet all your engine requirements—oil, gas, or "dual fuel". Contact Worthington Pump and Machinery Corporation, Engine Division, Buffalo, New York.

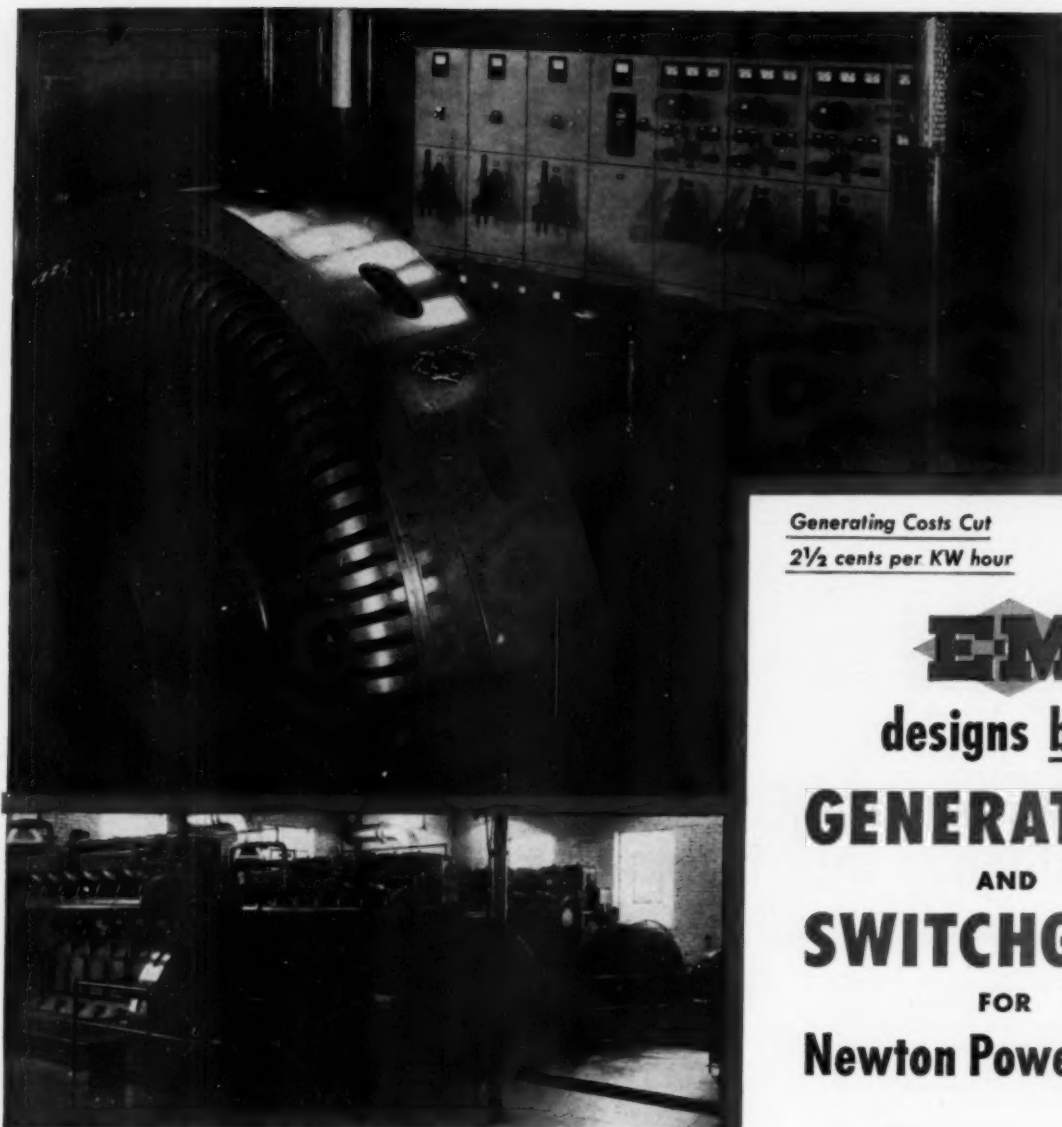
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### Worthington-Built Auxiliaries



Economical Continuous Power—Diesel Engines, 150 to 2,640 hp . . . Gas Engines, 190 to 2,880 hp . . . Dual Fuel Engines, 150 to 2,640 hp.





In the foreground is one of three 560 KW, leading-power-factor, E-M Generators in the new municipal power plant at Newton, Illinois. Coordinated E-M Switchgear is in back. Completely integrated modern design of diesel-electric plant has slashed costs per KW hour to one cent . . . less than one third of former cost.

#### Generating Costs Cut

2½ cents per KW hour



designs both

**GENERATORS**

AND

**SWITCHGEAR**

FOR

**Newton Power Plant**

E-M Generators and Switchgear direct-connected to super-charged diesels in operation at Newton. Result is economical, regulated electric service to the people of Newton.

ORDINARY citizens are learning about generating plant efficiency at Newton, Illinois. In 1950 they saw the opening of the new Diesel-Electric power plant which replaced a 56 year old original plant. This new plant has cut generating costs for them by approximately 2½ cents per KW hour!

You may be interested in knowing that a substantial part of this important municipal saving is coming from E-M "coordinated design". . . Generators and Switchgear, designed to match each other as combined and integrated units of the new plant. At Newton, the E-M switchboard is engineered for those particular generators. No separately manufactured generator and switchgear can match operating characteristics so closely. Every power plant customer gets better

service, fewer breakdowns, safer, more efficient operation . . . and most important to any city whose old plant was losing money—greater savings.

Your future with E-M equipment is bright, too. The three E-M 560 KW leading-power-factor Generators at Newton are constructed for lifetime operation. E-M Generator frames are welded, rolled steel. Coils are insulated for high dielectric strength. The coordinated 8 panel switchboard is easily adaptable to future expansion.

A community or institution takes a big first step toward power plant economy by specifying E-M "coordinated design" for its generators and switchgear. Write for our Bulletin No. 196 or talk to your nearest E-M field engineer.

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**SPECIALISTS IN GENERATOR AND SWITCHGEAR ENGINEERING**

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And, month after month, the list grows as new Superior and Atlas Diesels are installed to supplement present plant capacity, and to provide new sources of power.

Because so many of these efficient engines are in use in so many localities, it's easy to obtain detailed records of performance and acceptance—

- How one community saved \$10,000 in six months with a Superior Dual-Fuel Engine.
- Why so many purchasers keep on adding Atlas and Superior Diesels as demands increase.
- What factors made it possible for a Superior Diesel power plant to pay for itself in two years.
- Where a town paid off its original three-engine plant investment, and the cost of three additional Superior Diesels, in ten years.

Throughout the United States, and in Latin America too, the engineering and service representatives of the Engine

Division will advise on the selection of Atlas and Superior Diesels for every purpose. You can take advantage of the operating economies and dependable performance of Superior and Atlas Diesels by writing or calling the Engine Division for the location of the nearest regional office.



## THE NATIONAL SUPPLY COMPANY ENGINE DIVISION

Plant and General Sales Offices: Springfield, Ohio  
DIESEL ENGINES • DUAL FUEL ENGINES • GAS ENGINES

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Nordberg Radial Engines are designed to give simple, compact, economical power. Their ability to burn gas efficiently permits this large internal combustion engine plant, the largest in Louisiana, to produce power 24 hours a day—day in, day out . . . at very low generating cost, which compares most favorably with hydro-electric or steam power.

**NORDBERG MFG. CO., Milwaukee, Wisconsin**

**Builders of America's Largest Line of Heavy Duty Diesel Engines, from 10 to 10,000 H.P.**

P152



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# NORDBERG

## DIESEL ENGINES



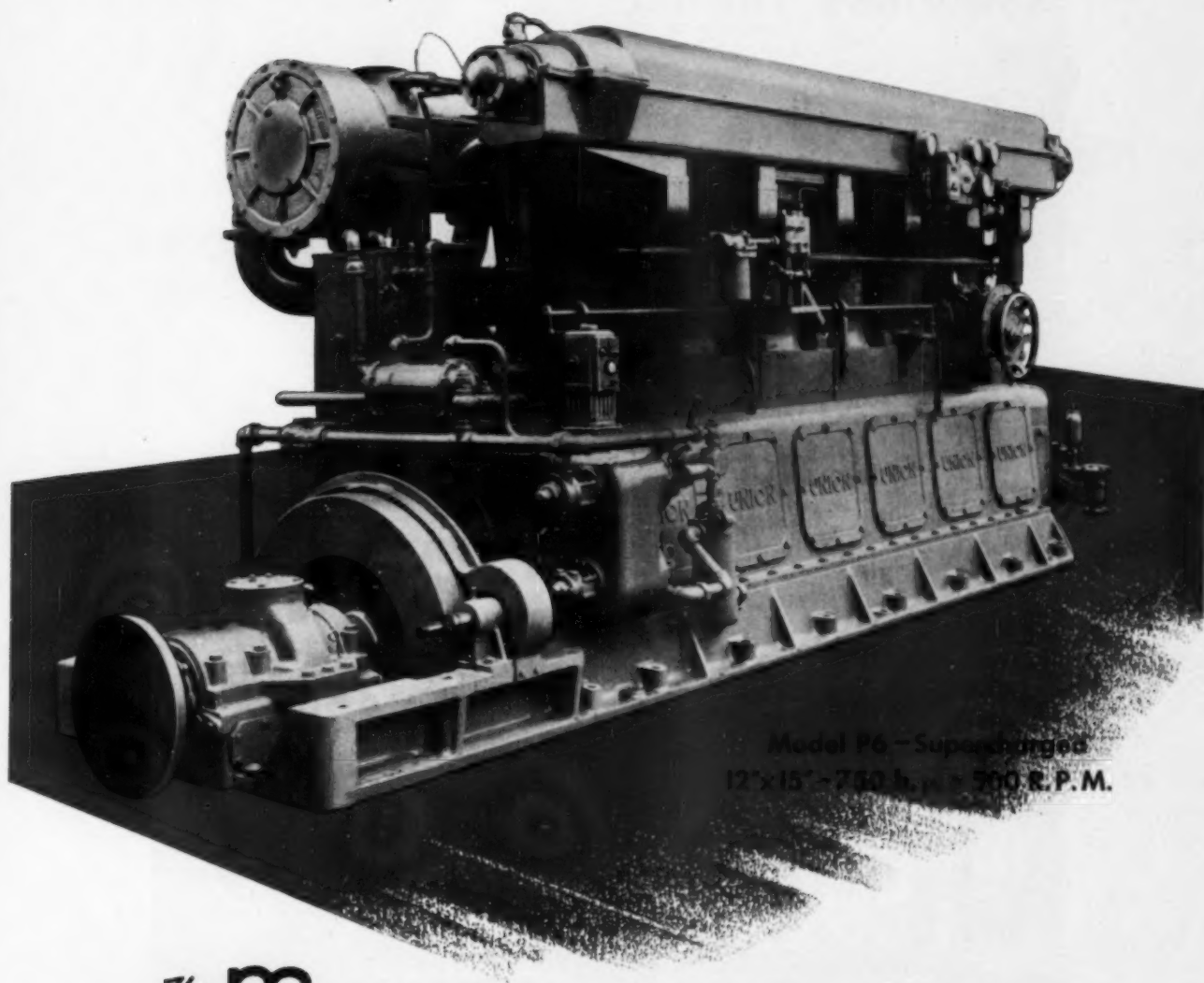
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# A *Marquette* HYDRAULIC GOVERNOR

*regulates the speed of this*

## UNION DIESEL MARINE ENGINE

("Cosbur II" of Vancouver, B. C.)



Model P6 - Supercharged  
12" x 15" - 750 h.p. - 500 R.P.M.

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# HIGHER PRODUCTION at HY-ROCK

## Two International TD-6s help increase production 300% for Indiana quarry

G. W. Bowen, president, Hy-Rock Products Company, Marengo, Indiana, was worried that his TD-6 would be too small for the job when he bought it in 1946.

But he isn't worried now—and he has two TD-6s working for him.

On the go 48 to 52 hours a week, these two Internationals have helped Hy-Rock increase production 300 per cent, to 170,000 tons per year. They handle every heavy job on the surface and dig out limestone a quarter-mile underground.

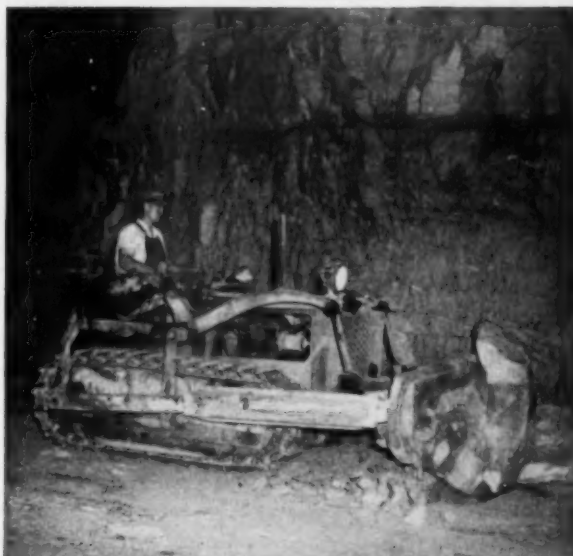
Want to know more about how International power can help raise your production and lower your costs? See your International Industrial Distributor for the full performance story. Look over his big parts department and his factory-designed service plant. You'll understand why more and more mine and quarry operators are equipping with International for the "Power that Pays."

INTERNATIONAL HARVESTER COMPANY,  
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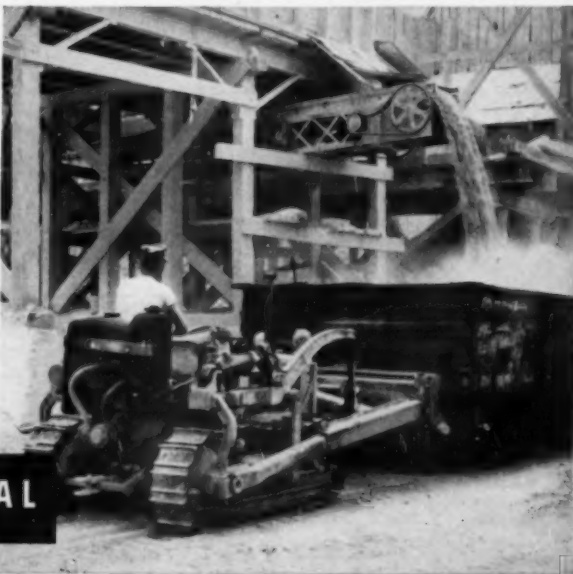


INTERNATIONAL

POWER THAT PAYS



**ONLY ACTIVE UNDERGROUND LIMESTONE MINE** in Indiana. International TD-6 crawler works a quarter mile underground at Hy-Rock quarry.

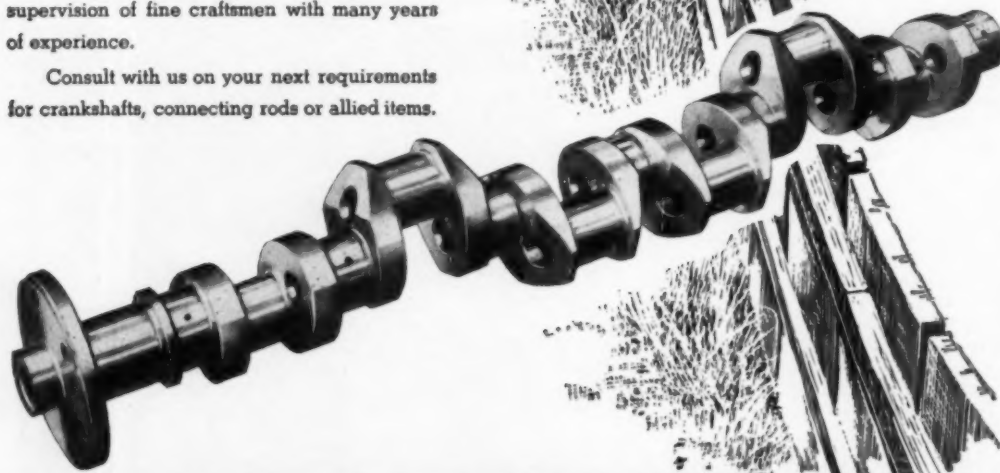


**TD-6 TURNS LOCOMOTIVE.** This rugged little International booses from one to nine loaded railway cars in addition to handling a host of other jobs below and above the ground.

## One Control.... One Responsibility

THE final result of this youngster's activity is entirely dependent upon his ability. He stands or falls on his own. That's the way we here at Erie Forge approach your problem—we take it over completely—One Control—One Responsibility. Every step—from raw material to finished crank is accomplished here. Design, metallurgical control, casting, heat treating, forging and machining are under the constant watchful supervision of fine craftsmen with many years of experience.

Consult with us on your next requirements for crankshafts, connecting rods or allied items.



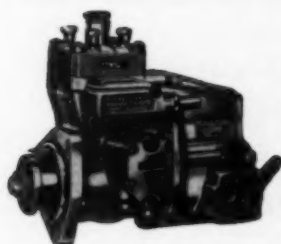
**ERIE FORGE COMPANY, ERIE, PA.**





In rugged farm tractor service—in blazing heat and clouds of gritty dust—American Bosch PSB single-plunger fuel injection pumps have operated nearly 3000 hours without need for overhaul—the equivalent of 5 years trouble-free service.

## PROVED ON THE TOUGHEST JOBS... AMERICAN BOSCH *PSB* fuel injection pump



Tried and proved in the severest service, the American Bosch PSB single-plunger multi-cylinder fuel injection pump is expanding the use of economical Diesel power in fields where automotive-type Diesel engines are particularly adaptable.

Considerably smaller in size and weight than comparable multi-plunger types, the PSB pump uses only a single plunger to serve as many as six engine cylinders—can be more easily serviced in the field—reduces substantially the cost of injection equipment for small Diesel engines—has rolled

up remarkable records of performance in severe service.

The engineering and production techniques that made possible the successful development of the single-plunger injection pump result from over 40 years experience of American Bosch in the design and manufacture of precision products—coupled with a strong research program that leads constantly to new and better contributions to the automotive, aviation and Diesel industries. American Bosch Corporation, Springfield 7, Mass.



# American Bosch

MAGNETOS • GENERATORS • VOLTAGE REGULATORS • IGNITION COILS • ELECTRIC WINDSHIELD WIPERS • DIESEL FUEL INJECTION EQUIPMENT

AMERICAN BOSCH CORPORATION • SPRINGFIELD 7, MASS.



**S**EALED POWER PISTON RINGS are used exclusively in the 80 radial type Nordberg Gas Engines in the new Chalmette, Louisiana, plant of the Kaiser Aluminum & Chemical Company. The above photograph is a general view of Nordberg Gas Engine Building No. 1, containing 40 engines.



SEALED POWER  
CORPORATION  
MUSKEGON, MICHIGAN

**Sealed Power**  
PISTON RINGS · PISTONS  
CYLINDER SLEEVES



# DIESEL and GAS ENGINE PROGRESS

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## CONTENTS FOR FEBRUARY, 1952

Diesel Dredge With 10,950 HP.....	33
Diesel Yacht <i>Dolphin Bay</i> .....	37
Baltimore and Ohio Shop Program.....	38
Soil Conservation—A Diesel Job.....	40
Kaiser Aluminum.....	44
Tuna Clipper <i>Columbia</i> .....	56
Air-cooled Aircraft Diesel Engine.....	58
New Union Diesel P-6.....	60
What's Going On In England.....	62
Servicing Zero-Lash Hydraulic Valve Lifters.....	64
Benson, Minnesota.....	66
From Horses to Diesels.....	70
Freezing "Cats".....	74
New Camshaft Bearing.....	91

DIESEL PROGRESS for February, 1952, Vol. XVIII, No. 2. Published Monthly by Diesel Engines, Inc., 816 N. La Cienega Blvd., Los Angeles 46, California. Tel. BRadshaw 2-6273. Subscription rates are \$5.00 for U.S.A. and possessions. All other countries \$7.50 per year. Subscriptions may be paid the London office at £2-12-6d per year.

DIESEL PROGRESS is indexed regularly by Engineering Index, Inc.

## EDITORIAL AND PRODUCTION OFFICES

816 N. La Cienega Blvd.

Los Angeles 46, Calif.

NEW YORK 36:  
Wilbur W. Young  
2 West 45th Street  
Murray Hill 2-7333

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12-volt cranking motor,  
with frame-mounted  
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Diesel engines have proved their economy and  
dependability as a source of power.

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To user and manufacturer alike, the Delco-Remy name  
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equipment that helps keep their Diesels on the job.



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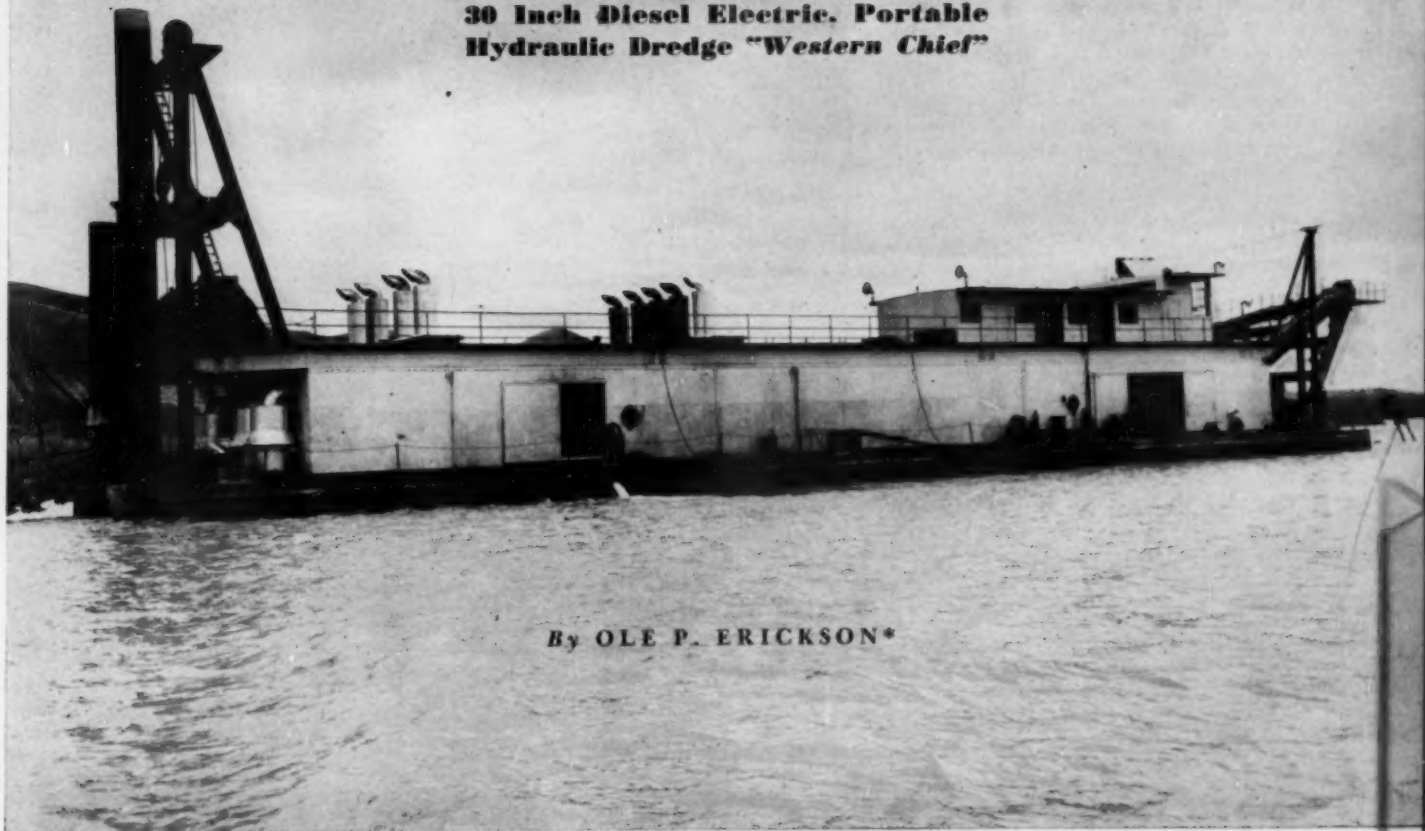
After  
wiring

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FEBR

# DIESEL DREDGE WITH 10,950 HP.

30 Inch Diesel Electric, Portable  
Hydraulic Dredge "Western Chief"



By OLE P. ERICKSON\*

**T**HE 30-inch diesel electric, portable, hydraulic dredge *Western Chief*, owned and operated by the Western Contracting Corporation, Sioux City, Iowa, was assembled early in 1951 at Fort Randall Dam, Pickstown, South Dakota, by Western Contracting's own forces. The component parts of the dredge were built to plans and specifications furnished by the Erickson Engineering Company, Tampa, Florida, consulting engineers specializing in dredge design and dredging problems.

The order to proceed with the design of the dredge *Western Chief* was given in May 1950 and the dredge began operations in April 1951, or eleven months later. As soon as the detailed plans and specifications of the component dredge parts were received from the Erickson Engineering Company, Western Contracting Corporation obtained quotations from various manufacturers throughout the United States and the orders were placed with the most responsible firms. As soon as the hull sections arrived at Fort Randall Dam, assembly began on a prepared site in the dry. The twenty hull sections fitted together without difficulty and were bolted up ready for installation of engines, generators, switchboard equipment, dredge pump, etc.

After the deck house was assembled, the electric wiring and piping, aligning of engines, dredge

\*Consulting Engineer.

pump, shafting, bearings, reduction gear and four 1500 hp. motors were installed. The permanent installation of the diesel engine accessories and other auxiliary equipment such as pumps, heat exchangers, oil purifiers, etc. continued in the various hull sections and will be moved with the sections without dismantling.

The hull is of sectional construction 170 ft. x 46 ft. x 11 ft. There are twenty sections of varying lengths so that all the transverse joints are broken. There are four double internal longitudinal watertight bulkheads and six transverse watertight bulkheads dividing the hull into a total of more than thirty compartments. This gives the dredge an exceptionally strong and practically non-sinkable hull. The deck house is also sectional. All outside hull plating is  $\frac{1}{2}$ -inch, inside bulkhead plating is  $\frac{3}{8}$ -inch and  $\frac{1}{4}$ -inch, all braced to conform to the American Bureau of Shipping and Lloyds of London requirements. All bolts in hull, house, forward A-frame and spud gantry are  $1\frac{1}{2}$ -inch alloy steel bolts. All hull bolts have special oil resisting rubber washers. Average freeboard under operating conditions is 36 inches to 45 inches trim, down with bow about 6 inches, or as desired by fuel trim.

Six Cleveland diesel Model GM 16-278A engines, each 1600 hp. and three Cleveland Diesel Model GM 8-268A engines, each 450 hp. or a total of 10,950 diesel hp. is on board. The six GM 16-278A

engines each drive an Allis-Chalmers 1200 kw. dc. generator all connected to a common bus on the control switchboard, so that the load may be distributed as needed on the dredge to pump, cutter swing, or auxiliary equipment. Several of the engines may be shut down on short pipelines or in soft material dredging when all the power is not required. All the engines, generators and electrical equipment and installations conform to U. S. Navy specifications. All the auxiliary pumps and equipment on the dredge are operated by alternating current furnished by two 200 kw. motor generator sets through an ac. switchboard.

The ladder is of built-up girder construction designed to dredge hard materials, including soft to medium hard rock, and to withstand all stresses from the 1500 hp. cutter motor. The ladder is 65-ft. long and can dredge to a depth of 48-ft. The ladderhead is fitted with a Cutless rubber bearing 14 $\frac{1}{4}$ -inch diameter bore by 60-inch long. The ladder girder depth is 5 ft. Ladder trunnion pins are 6 ft. long by 17 $\frac{3}{8}$ -inch diameter. The 36-inch id lined suction pipe is welded into the ladder forming a strength member. Ladder is bolted together in two sections. The total weight of the ladder with cutter, cutter reduction gear, shafting and motor is 200 tons.

The A-frame is connected to and designed as part of the dredge deck house and ties into the spud



gantry aft. Its main members running continuously serve also as a pump and engine room crane track from end to end of engine and pump room. The A-frame and crane track are bolted together in suitable sections for shipment by nickel alloy bolts. The upper ladder hoist block is built into the top of A-frame and is a part thereof.

The anchor booms are designed to pick up the anchor with a 30,000 pound line pull. The backstays are tied into the forward A-frame and forward house corners. The anchor booms are of the fixed type with rotating top sheaves and are 85 ft. long. The spud gantry is made up of heavy WF-beams and H sections, and in addition angles are welded to the after side of the 14-inch H-beams, making it 26 inches wide so that spud hoist sheaves can not become fouled under any conditions. The gantry is in sections and is bolted with nickel alloy steel bolts.

The spuds are made from silicon alloy steel 42 inches in diameter, build up steel points, 60 ft. long with heaviest plate at points of maximum stress. The spuds are provided with holes for inserting stop pins for the spud sheave counterweight for any depth of water in which the dredge may work. Weight of spuds, 30 tons each. The two drum spud hoist is located on top of after deck house directly under the spud gantry so that the spud cables have a fairlead from top of gantry sheaves directly to drums. The spud sheave counterweight keeps the cables from fouling on drums, thus making for long cable life. The hoist is operated by a 120 hp. dc. motor with Ward Leonard control. Maximum lifting speed of spuds is 70 ft. per minute.

The five drum swing gear is driven by two 120 hp. dc. motors, Ward Leonard control, ranging from approximately top speed of 150 ft. per minute to creeping speed; maximum swing cable pull 75,000 pounds. The ladder drum is made considerably larger than the other drums so that the hoist cable will lay in machined grooves on drum without double layer of cable. The anchor hoist drums are made slightly larger than the swing drums for faster spooling of the anchor hoist cable. Hoisting speed of ladder is 20 ft. per minute on ten part line. Swing, ladder and spud wires are 1 3/4-inch diameter, and anchor hoist wire 7/8-inch. The cutter is driven by a Westinghouse 1500 hp. dc. 600 rpm. motor through a heavy duty reduction gear with a top cutter speed of 36 rpm. and reduced by Ward Leonard control to any speed required. The cutter shaft is 14-inch diameter of special high alloy steel with end of shaft upset so that it has a 14-inch diameter at bottom of cutter thread. The cutter hub backs against a collar and hard babbitt washer on the cutter shaft and can be easily removed by reversing cutter motor.

The pump has a 36-inch suction and 30-inch discharge, swings a 72-inch three or four vane impeller and can pass solids 18 inches in diameter. The pump shell is split and completely lined. The shell liner is in one piece and can be renewed by remov-

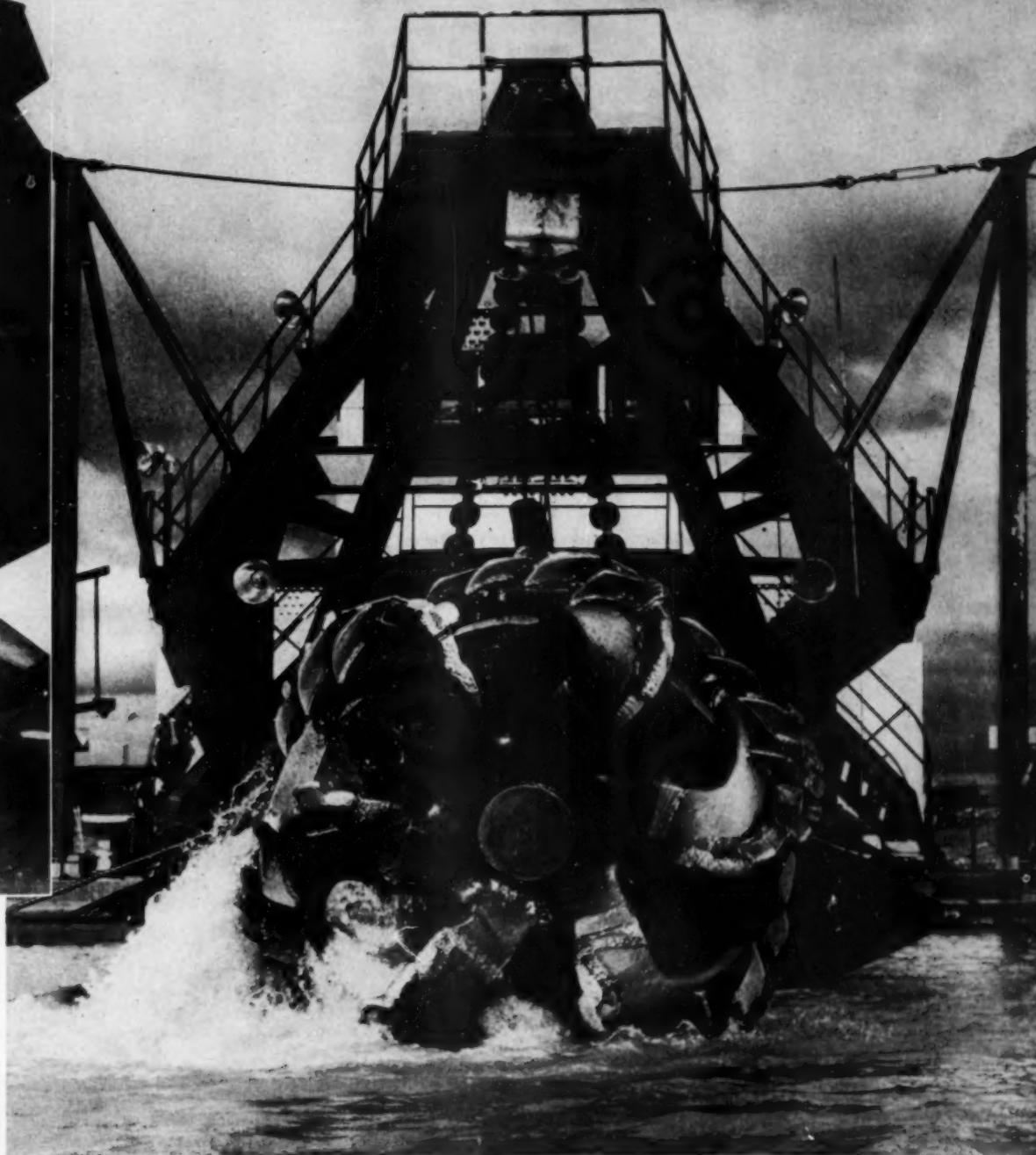
Looking forward showing 6000 hp. pump motors and switchboard, port and starboard. Note clear engine room space.







1500 hp. cutter motor and reduction gear.



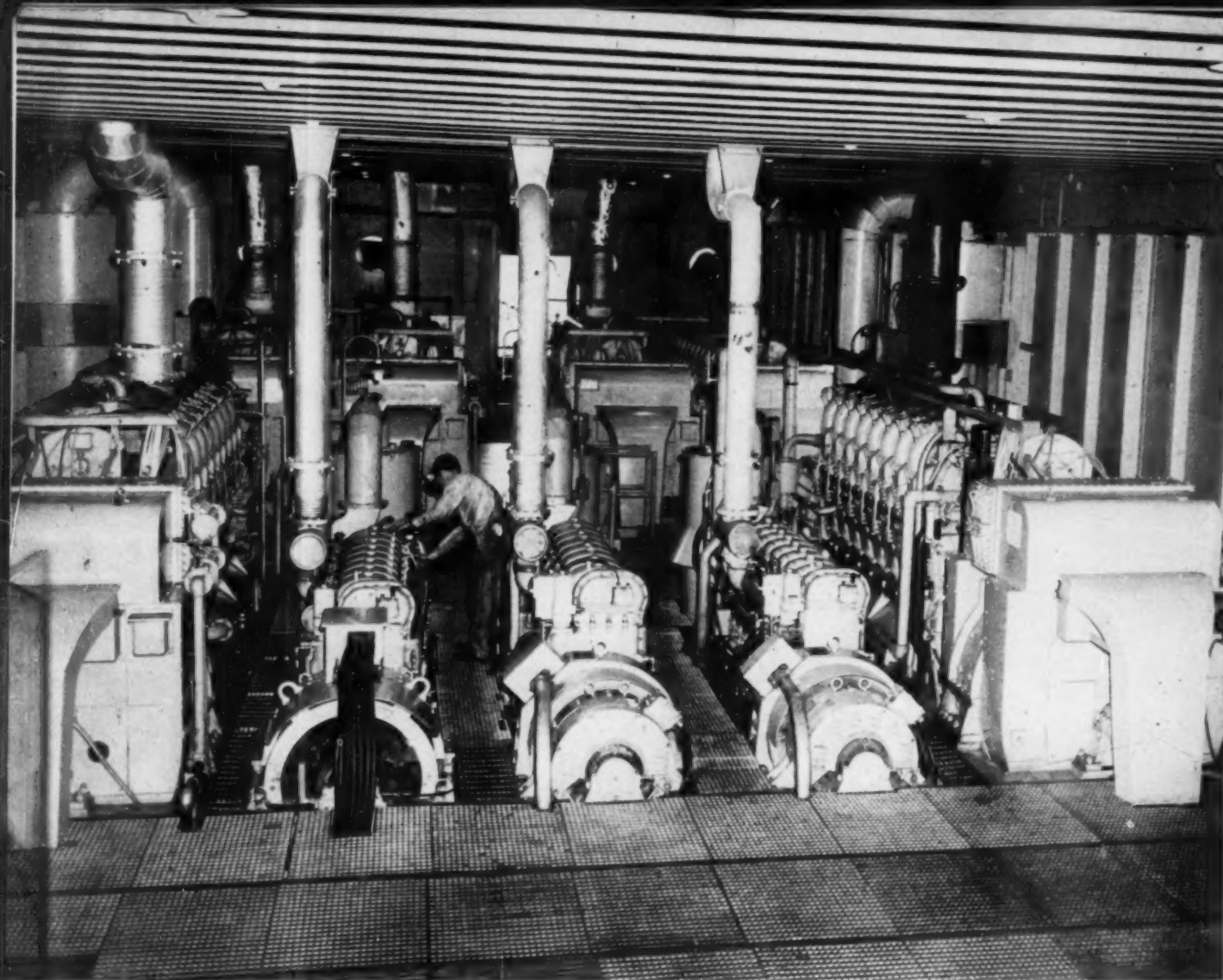
Cutter head of dredge showing soft material cutter, A-frame and anchor boom supports.

ing top half of pump casing. Both the shell liner and faceplate liners are made of alloy steel or special cast iron alloys depending on the materials that are to be handled. The pump shaft is 14 inches in diameter and made from special high alloy steel. The runner is screwed onto the shaft and can be easily removed by reversing the pump motors. The pump is driven by four Westinghouse 1500 hp., 600 rpm. motors, totaling 6000 hp., two motors per shaft through a reduction gear, flexible coupling Kingsbury thrust bearing and Kingsbury steady bearings. The pump stuffing box packing is located

on the impeller hub permitting close connection of impeller to pump steady bearing. Pump speed can be varied by Ward Leonard control for best production, depending upon length of pipeline and material pumped, with a top speed of 425 rpm. A Peri-jet gas ejector is located on the suction pipe to assist in priming the pump and to remove gases from suction pipe when handling gaseous materials.

The cutters for soft material dredging weigh 15 tons and are equipped with renewable wear edges

on blades. The edges are spot welded to the blades, cut loose when worn down and new wear edges attached. These wear edges are of wear resisting alloy steel. The rock cutters weigh 16 tons and have sockets for the insertion of 5-inch to 5-inch square alloy teeth of various types depending on the material dredged. The cutters may be removed from the shaft by reversing cutter motor and unscrewing. The cutter reduction gear 18:1 is designed to meet AGMA specifications. Gears are Herringbone and Helical, alloy shafts and anti-friction spherical roller bearings. Total weight 48



Main power plant, 10,950 hp. of Cleveland diesels with Marquette hydraulic governors.

tons. Pump gear 1.4 to 1. Gears are Herringbone, alloy shafts and anti-friction bearings.

All controls for the dredge pump, cutter, swing and spud hoist are located within easy reach of the operator. The swing, ladder hoist and spud lever system is operated by Westinghouse Air-brake controls. The pump speed, cutter and swing is varied electrically as required for the type of material excavated, length of pipeline, etc. Vacuum and pressure gauges for the dredge pump are located in the operating room, also cutter, swing and pump rpm. indicators, ammeters for pump, cutter and swing horsepower in-pu. From the control room all of the operations of the dredge are directed by radio, telephone or signals, and there is clear visibility both fore and aft. Separate offices are provided aft of the operating room for the dredge Superintendent, Chief Engineer, and Inspectors.

A large separate room is also provided for the dredge crew. Separate toilet and shower facilities are provided for the officers and the crew. The 30-inch pontoon line is of the standard type and equipped with alloy steel ball joints. Shoreline is of the standard slip joint type. A 350 hp. twin

diesel portable dredge tender and 25 ton portable derrick barge make up the auxiliary equipment.

Lights are installed in all the hull compartments as required. Engine room is thoroughly lighted for continuous operation. Plug in connections for portable equipment and lights are provided. Outside lighting consists of lights around the house and on pipeline to shore. Large floodlights are installed for thorough lighting of the spud gantry and operation of spuds. Likewise the forward A-frame and ladder is lighted from floodlights on each forward corner of house. In addition, floodlights are also located under A-frame. A large searchlight is located on top of operating room for distant observation.

The *Western Chief* was designed as an all purpose dredge for excavating and handling soft and hard materials not only on the inland rivers and lakes but also for work on the seacoast wherever dredging is required. It's portability is a great asset in this connection as it can be transported for coastwise or foreign work. It is the largest sectional hull diesel electric dredge now in operation, with a total displacement of 1500 tons.

### List of Equipment

Engines—Six Model GM 16-278A at 1600 hp. each and three Model GM 8-268A at 450 hp. each, Cleveland Diesel Division, General Motors.

Generators and Switchgear—Allis Chalmers.

Governors—Marquette Metal Products Co.

Heat Exchangers—Young Radiator Co.

Auxiliary Pumps and Compressors—Gardner Denver Co.

Air Lines—Aeroquip Corp.

Pump Reduction Gear—Westinghouse Electric Corp.

Pump and Cutter Motors—Westinghouse Electric Corp.

Swing and Spud Motors and Speed Reducers—Westinghouse Electric Corp.

Electric Cable—General Electric Co.

Rubber Flexibles—Goodyear Tire & Rubber Co.

Pipes, Valves—Crane Co.

Cutter Reduction Gear—Western Pacific Gear Works.

Bearings—SKF Industries.

# DIESEL YACHT "DOLPHIN BAY"

**The Diesel Yacht *Dolphin Bay* is Proudly Owned  
by Mr. and Mrs. John M. Sorenson, Eastsound,  
Washington. This Fine Little Ship is 48' by 13' by  
4'7" and is Driven by a Caterpillar  
D318 Diesel Engine**

*By W. L. BODE*



37





# BALTIMORE AND OHIO SHOP PROGRAM

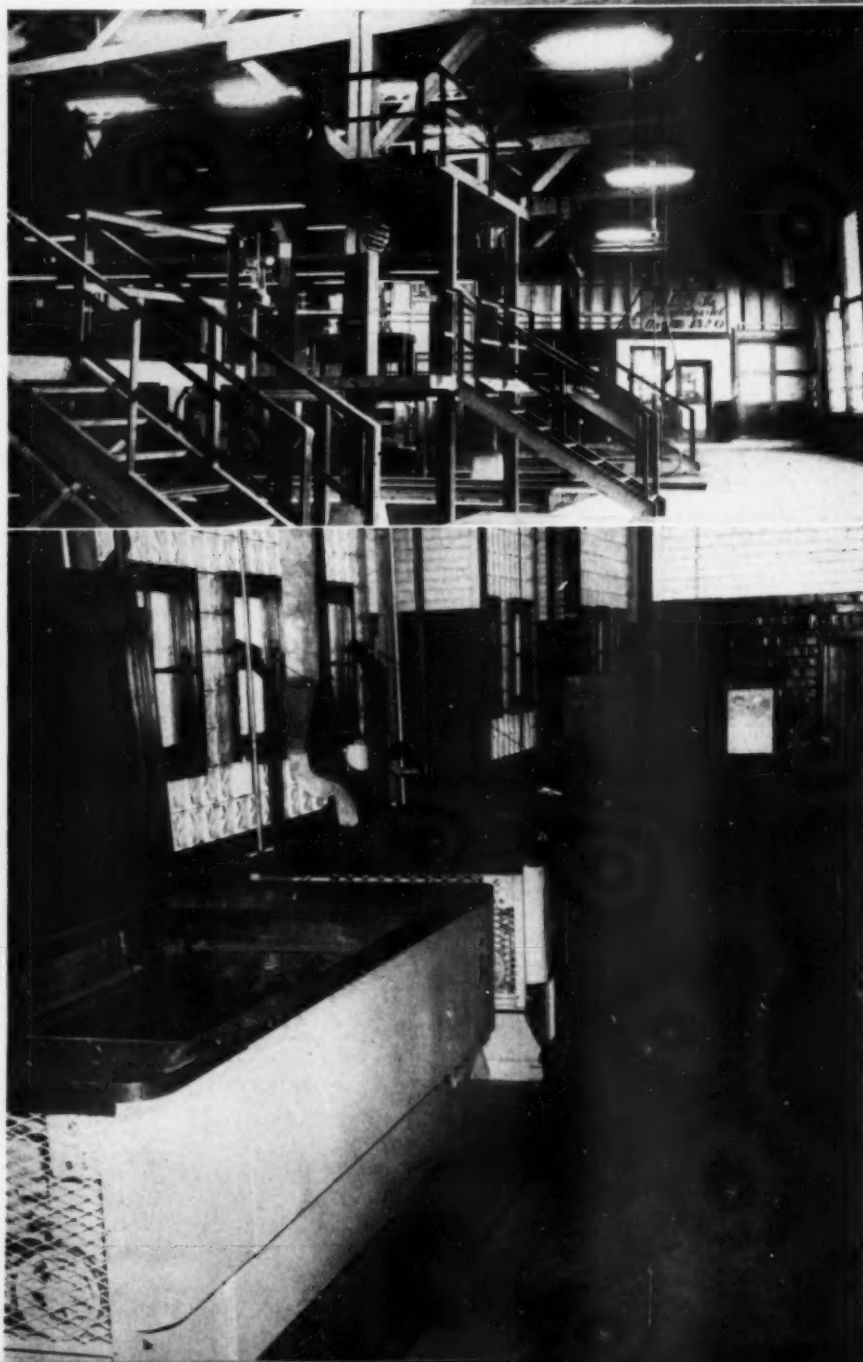
## B & O Completes a \$3,700,000 Shop Program For Its Diesels

By CHARLES F. A. MANN

**T**HE first Eastern trunkline to adopt diesels, the Baltimore & Ohio Railroad, continues to surprise the railroad industry with its forthright and large-scale modernization program that will bring its operating costs down to the lowest levels of comparable large systems. Back in 1935, when the managements of all other eastern systems except one, were mostly blind to the great new economical source of motive power, the Baltimore & Ohio, and the Alton, which it then owned, boldly pioneered the first separate road diesel units (as distinguished from the diesel rail cars of the Burlington and Union Pacific). At first, everybody in the industry was amazed that the nation's No. 2 coal carrier would even think of exploring the diesel field.

But results on this System which is more "Western" in its topography and profiles than almost any other eastern system, proved that diesel could save enough to eventually equal about what the annual system net profit should be in a normal year! So, today, the Baltimore & Ohio, despite its mighty tonnage of coal and coke, representing 42% of all its total freight traffic last year, is now hauling nearly 40% of its gross ton freight miles with diesel and better than 55% of its passenger train miles. By the end of 1951, the B & O will be doing about 65% of its switching with diesels, too. To care for this rapidly growing fleet of diesels, which now comprises 596 diesel units, made up of 292 freight, 66 passenger and 238 switchers, plus 35 additional diesel units on its vital subsidiary at Chicago—the B & O Chicago Terminal Railroad, or a grand system total of 631 diesels totalling over 1,000,000 hp.

The \$3,700,000 diesel shop program is spread over the entire system, fourteen smaller facilities and two very large conversions of former steam shops at Glenwood, Pa. near Pittsburgh and at M. & K. Junction near Grafton, West Virginia, to care for low-geared diesel helpers on the Allegheny mountain section. The smaller shops are located at Benwood, W. Va.; Connellsville, Pa.; Riker, Pa.; Smithfield Pa.; Washington, D. C.; Cumberland, Md.; Haselton, Ohio; Willard, Ohio; Cincinnati, Ohio; Newark, Ohio; Grafton, W. Va.; East Salamanca, N. Y.; New Castle Junction, Pa.; and East St. Louis, Ill. Some are fuel, sanding, water and running inspection facilities, while others are equipped to do a wide variety of repair work on engines and running gear.



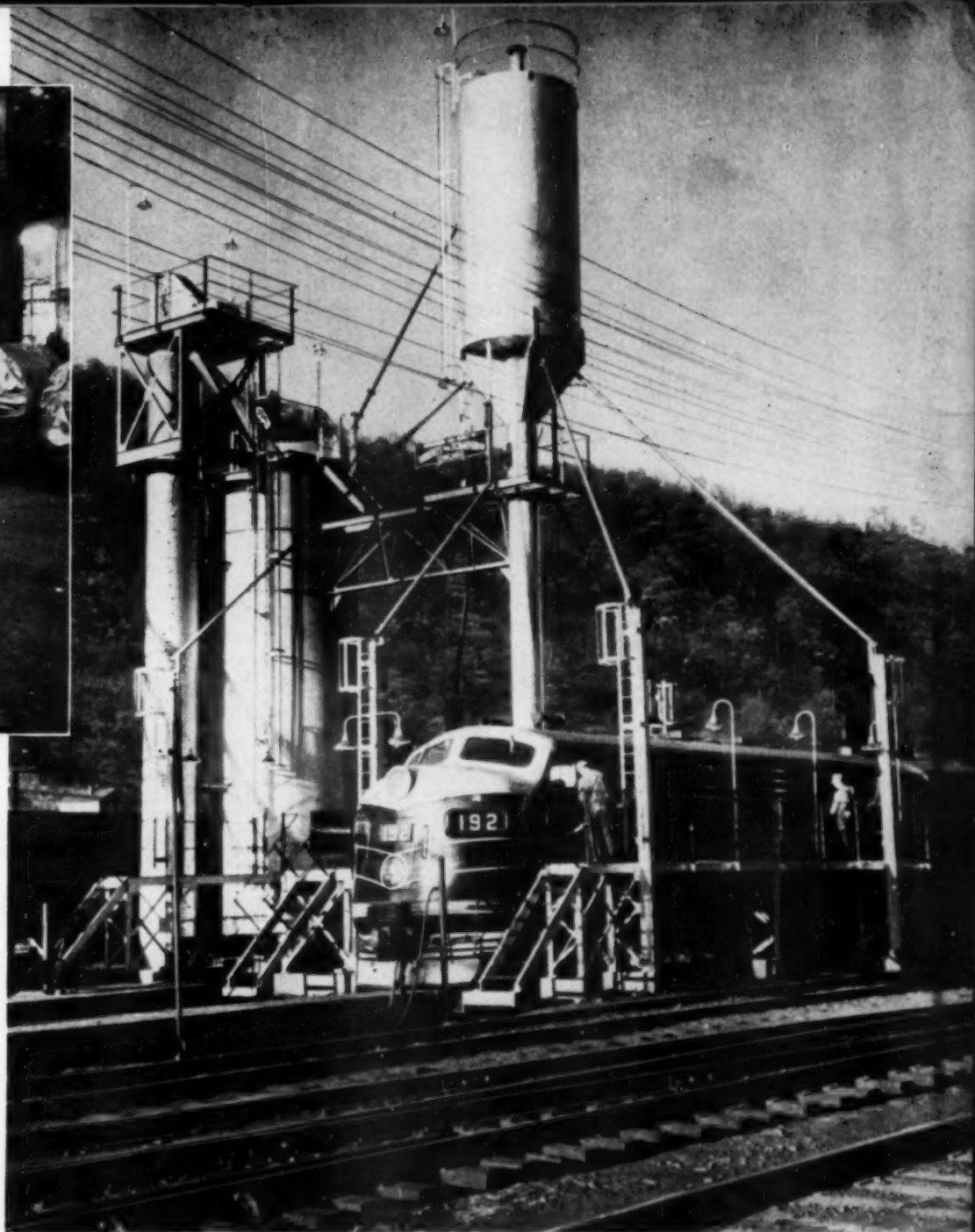




▲  
A view of the diesel shop at Mt. Clare, Baltimore, where complete rebuilding and heavy repair jobs are handled.

◀  
Interior of new B & O diesel shop at Glenwood, Pa., showing pits and platforms.

◀  
Cleaning vats for small engine parts in new diesel shop at M & K Junction, W. Va.



Outside diesel servicing facilities at M & K Junction, W. Va. include sanding tower, washing facilities, inspection pit, etc.

At the Glenwood, Pa. installation, it is a \$500,000 complete conversion of a steam locomotive shop into a diesel maintenance and repair facility. Much additional investment is being made in equipment and auxiliary facilities. Complete heavy repair work on 200 diesel units per year is possible here, including main engine, all accessory equipment, traction motor and generator rebuild work and everything else necessary to make the big machines operate, including reworking of all running gear. Elevated platforms, built like a bridge, as well as

pits, enable work to be done simultaneously on all parts of the diesel at once. This shop will compare favorably with the Mt. Clare shops in Baltimore, grand-daddy of them all. Two other major diesel overhaul points, at Cumberland, Md. and East St. Louis, Ill., enable the B & O to efficiently dispatch all diesel work at these four points, convenient to established operating terminals points out of which they operate. These four points are also near the center of major switching terminals, which are practically 100% dieselized.

The other large general diesel shop just finished is at M & K junction, where, on a smaller scale, heavy repairs can be done to the diesel helper fleet centering at this point. Both Glenwood and M & K Junction shops represent a complete conversion from steam to diesel, the Glenwood steam shop originally a \$2,000,000 steam facility built new in 1919, then considered the last word in railroad shops. Glenwood shop will, because of its central location between Baltimore, Chicago and St. Louis, be the largest diesel shop on the system.

# SOIL CONSERVATION - A DIESEL JOB

By EDWIN A. HUNGER

**P**OWER equipment in a variety of sizes and types is doing a wonderful job in accelerating the important work of soil conservation. Terraces, grassed waterways, diversion and drainage ditches, farm ponds or tanks as they are called in the West, dams, levees and other structures built by this equipment help in a big way to keep the valuable top soil on the farm where it belongs. These structures also greatly reduce rainfall runoff and thus increase moisture content of the soil for better crop production. Gullies are also filled, land levelled and smoothed for more efficient farm machine operation.

Equipment owned by the farmer of course plays a big role in practically every farm face-lifting project the local experts of the United States Soil Conservation Service may suggest. Frequently that is all that is needed. Equipment operated by a new type of farm custom worker is also increasing in demand. This is the soil-conservation contractor whose numbers in the past several years have jumped by leaps and bounds. This contractor very ably takes over with heavier diesel-operated equipment to do jobs that farmers frequently cannot do with their ordinary tools. According to a tabulation by the United States Soil Conservation Service, there are some 16,034 private contractors with 40,250 major pieces of equipment working with soil-conservation districts. Of course, most of this equipment is diesel operated.



Edwin A. Hunger, recently retired from the Consumer Relations Department of International Harvester Co., Chicago, Ill., and whose home address is now: Route 8, Box 932, Battle Creek, Michigan, is the author of this fine article on Soil Conservation and what diesels are doing to help it. We welcome Ed Hunger to our editorial staff.

Banks are doing an important work in encouraging soil conservation not only in financing the purchase of equipment by soil-conservation contractors but also in helping the farmer pay for the work done by these contractors by long-term finance plans. A pioneer in this type of financing is the Trust Company of Georgia. Its farm contracting plan was conceived several years ago by the late Robert Strickland, president of the Trust Company, to open a new way for returning veterans and others to become independent in their own business. This farm contracting plan has helped to supply the men and machines sorely needed in Georgia's soil programs.

The power and inspiration behind all the great soil conservation effort that is now going full tilt all over the country, of course, is the great United States Soil Conservation Service itself, and its dynamic soil-saving missionary, Dr. H. H. Bennett, who just recently was promoted from chief of the Service to special assistant to Secretary Brannan. For sixteen years from the very organization of the Service, Dr. Bennett reported with increasing optimism on the work accomplished. "While we admittedly are not moving fast enough," he said in the Service's latest annual report, "and are still suffering heavy losses of soil, we are, nevertheless, moving ahead at a rate that is not at all discouraging. At the end of the first seven years of work in 1941, the Soil Conservation Service had directed

Figure 1



the conservation treatment of 26,600,000 acres, an average of 3,800,000 acres each fiscal year for this first period. In 1950 basic conservation measures were applied to 26,071,342 acres. This was an increase of 388 percent, nearly five times as much work done as on the 5,338,000 acres in 1942. The job is being done at a rate so much faster than I ever expected to see, even as recently as 15 years ago that I feel almost jubilant over the progress that's being made."

The layman may ask just what is the United States Soil Conservation Service and how does it operate. In its operations one may truthfully say it is democracy working at its best. It is based on the thought that a farmer should be sold on adopting a soil-conservation program instead of being forced to do it by peremptory law. There was no national program of soil conservation in the United States until the Soil Erosion Service was created as an emergency agency in the United States Department of the Interior in 1933. In 1935 Congress passed the first soil-conservation act and



Figure 2

own farm fits into a district-wide plan. Farmers often work in groups, helping each other apply good land use and conservation measures to their land.

An amazing thing about this big country-wide movement to conserve the soil is the unselfish way dealers, contractors, teachers, government people, publications and, yes, the numerous farmers themselves who are sold on soil conservation have gone all out to promote interest in proper soil-conservation practices. How dealers and contractors and farmers have given of their time and labor and loaned costly equipment for demonstrations, especially the so-called rebuild-a-farm-in-a-day affairs, is inspiring evidence of how democracy in cooperative effort can and does promote the welfare of the nation. For instance, there was a demonstration at Sanford, Florida, where the contractors who



Figure 3

transferred the Soil Erosion Service to the Department of Agriculture and renamed it the Soil Conservation Service. In the program so far all states and territories of the nation have passed laws permitting farmers to organize their own soil-conservation districts. These districts are local units of government and they are organized and run by farmers. They have the authority to ask and receive help from county, state and federal governments. The local men who represent the United States Soil Conservation Service to whom the district officers call for assistance are called unit conservationists. Above these are district conservationists and all these take orders from a state conservationist. Then there are six regional conservators, all of whom are grouped under the chief of the Service in Washington.

There are now some 2,200 soil-conservation districts and they cover a total area of more than 1,200,000,000 acres and include about four-fifths of all the farms and ranches of the nation. In these self-governing districts farmers are cooperating to protect their land. The work of each farmer on his



Figure 4



specialize in land-clearing and conservation work were out in force on such a one-day farm-rebuilding affair. They called it "Miracle Soil Conservation Day." The project was to re-work a 385-acre farm of the Fellowship Biblical College in a single day. Leno De Shong, prominent landclearing contractor of Plant City, Florida, was there with several of his tractors. One of these, an International TD-24 diesel (Fig. 1.) crawler was all over the place doing yeoman service. In one of the illustrations this TD-24 is shown knocking down a huge pine tree and in another is shown with another crawler, an International diesel TD-18 (Fig. 2) loaned by Orange County gouging out dirt for a farm pond, which at the end of the day was filled with water and stocked with fish.

Another of these remarkable farm rebuilding days was at Shawano, Wisconsin. A whirlwind terracer literally took the show at this demonstration. It is shown in an accompanying illustration pulled by an International TD-6 (Fig. 3) diesel crawler tractor. When this whirlwind job gets a-going, it really throws the dirt and incidentally for photographic fun its operation provides real whirlwind action. It consists essentially of an 18-inch mold-board plow and behind it a three-speed vertical rotor operated by tractor power take-off. It moves some 650 cubic yards of dirt per mile. It is especially effective in building level-type terraces in silt-loam soils.

There are terraces and terraces and they are being built by all sorts of equipment and by various procedures to fit certain soil and contour conditions. In another illustration is shown how members of the Little Trappe Farm Association of Lincoln County, Wisconsin, are making good use of county-owned road maintainers rented to them at nominal fees in off seasons to build their terraces. A hardpan 14 inches thick prevails under the topsoil in this region making a special broadbase channel or drainage-type terrace necessary. The maintainer shown, an Adams motor grader operated by an International (Fig. 4) UD-16 diesel unit



Fig. 6

was at work on such a terrace in a 20-acre field with 2-percent slope on the farm of Oscar Schultz.

Sometimes one reads ranting stories on how the country is going to the dogs and the farm land is going to the sea and so what's the use of living. In Georgia some people keyed to this dirge tell how the 8 to 10 inches of fertile topsoil was shipped to Europe in the 19th century in the form of cotton and so tens of thousands of acres of land barren and gullied beyond repair had to be abandoned. Powerful diesels are fast changing this doleful thinking. In an accompanying illustration an International TD-14 diesel (Fig. 5) tractor and Heil bulldozer with 10-foot blade is fitting some of that so-called abandoned land for a new money-paying crop—not cotton but pasture for feeding a herd of Herefords. The outfit had just been purchased by J. A. Nolan of Rutledge, Georgia, to clear and fill all gullies on 250 acres of land that

had once been in crop after crop of cotton and become worn out and allowed to go back to brush and subgrowth. The land was limed and fertilized and seeded with a mixture of Bermuda grass, crimson and Ladino clover, lespedeza and Kentucky fescue. The tractor is shown filling a gully.

All over the old South, in Georgia, Florida and Alabama particularly, various types of dieselized outfits are hard at work on old cotton and cutover lands, dozing out brush, palmetto and weed trees, filling gullies and building terraces. Then the land is fertilized and planted to long-season grasses such as Kentucky fescue, thus providing a continued feast for money-producing black Aberdeens, white-



Fig. 5



Figure 8



Figure 10



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Fig. 7

faced Herefords and hump-backed Brahmas. Truly, the beef-cattle industry has brought a new prosperity to Southern agriculture and diesels can be credited with a big assist in bringing it about. In the irrigated sections of the West, powerful diesels prevail in soil-conservation work. Large-capacity wheel scrapers, land levelers, ditchers and subsoilers operated by diesels are doing a good job not only in rearranging thousands of irrigated farms for better and more profitable production but also in bringing into additional profitable production thousands of acres of new land. No wonder then that among dirt-moving contractors, the man who clears new land and refits thousands of old acres looms big in the Western field.

It is natural, therefore, that methods of improving farms for irrigation were featured in various "Rebuild-A-Farm-In-A-Day" shows of the West. This was especially the case in the one held near Cottonwood, Arizona, and another near Denver, Colorado. A big job at each of these shows was to move thousands of yards of dirt from one part of each farm to another to fit each for effective irrigation. An International TD-6 diesel crawler pulling an Ateco land leveler (Fig. 6) and a diesel Farmall MD tractor (Fig. 7) pulling an irrigation border disc loaned by H. B. Wingfield of Camp Verde are shown in operation on the Cottonwood project. Several International ID-9 diesel wheel tractors were loaned by the H. W. Moore Equipment Company of Denver for use at the Denver demonstration.

These are just a few of the thousands of constructive soil-saving jobs that diesels are powering every

day in every corner of the country. Now, what happens when the soil is neglected. Much of it is washed away, of course. What is left is often in the form of nasty scars and gashes. One could see these everywhere down below in flying over South Carolina a few years ago, but no more since the various soil-conserving agencies have been doing their wonderful work. Instead, one sees neat contoured crop rows and what is left of old gullies is filled with soil-clogging kudzu vines. In many parts of the country, however, the scars of soil neglect are still only too evident. In the hilly country of Northern Mississippi heroic efforts are being made to save the land. How serious the effects of erosion have already become in parts of this rough country are shown in an accompany illustration (Fig. 8) along a secondary highway. What used to be a lane going up to the farm above was completely washed away. Not only are the gullies shown encroaching on the fields above but also the sand that is continually being washed away clogs roadway ditches and in some places spreads out on good crop land.

Another illustration (Fig. 9) shows a big gully, 140 feet across and 55 feet deep, on an 80-acre farm northeast of Council Bluffs, Iowa, caused by a series of torrential rains. A few weeks before the picture was taken the pipe shown crossing the gully was underground. Twelve to 13 acres of the farm was a total loss. District Conservationist Arthur Torenson said that if this and five adjacent farms had been properly terraced this loss would never have occurred.

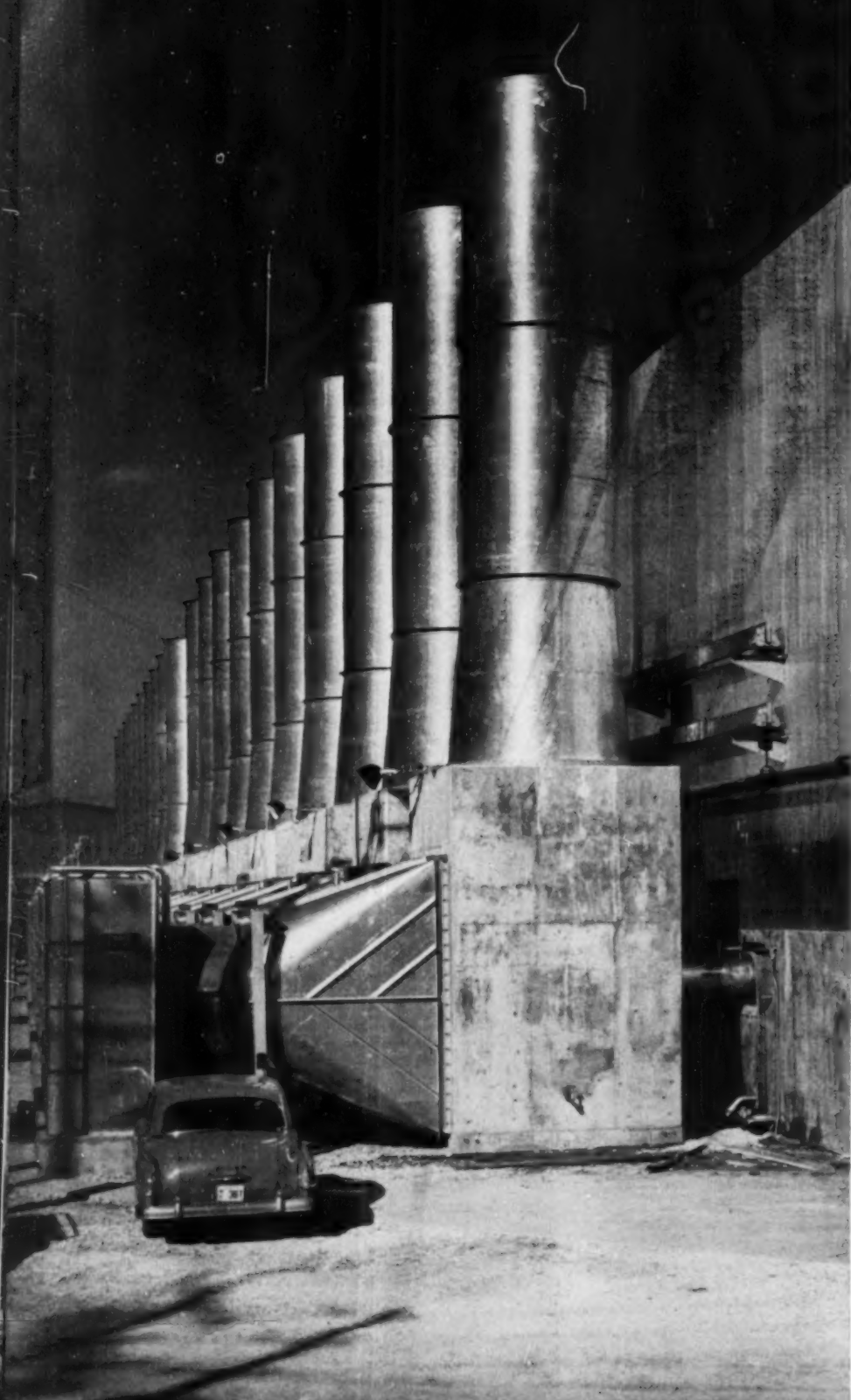
An all-too-common sight in certain sections after heavy rains is shown in still another illustration (Fig. 10). Here part of an eroded corn field in Southwest Iowa is shown. If this field had been terraced, the loss of an acre or more of eroded and trash-filled land with complete loss of corn yield and also loss of valuable top soil on the upper part of the field would have been prevented. It's a prodigious job this saving of the land, but as Dr. Bennett says, "We are controlling the erosion much faster than the public realizes."

Figure 9



# Kaiser Aluminum

By REX W. WADMAN



CHALMETTE, La., Dec. 20, 1951. Here at Chalmette, some  $6\frac{1}{2}$  miles from the business center of New Orleans, almost on the same spot that the Battle of New Orleans was fought in January of 1815, Henry Kaiser has won another battle, this one against time. He and his Kaiser engineers, started out some 10 months ago to perform one of his typical marvels of production and construction. The Kaiser Aluminum and Chemical Corporation undertook at that time to supply facilities to reduce 400,000,000 lbs.-a-year aluminum as a contribution to the Nation's vital aluminum supply and the Nation's vital requirements for aluminum.

To perform this huge production job a 280 acre site bordering the Mississippi River here at Chalmette was acquired and eventually, under present plans will contain some 75 buildings with nearly 35 acres of floor space, some  $3\frac{1}{2}$  miles of rail trackage, 60,000 sq. yds. of roadways, and innumerable items of equipment, both large and small. All these facilities will be needed to keep the heart of the plant—8 potlines containing 1,152 electrolytic cells—at their task of converting alumina to metallic aluminum at the rate of 46,000 lbs. an hour, 24 hours a day.

The major facilities of the plant will consist of 8 potlines. Besides being the focus of operations, the potlines form the plant's most massive feature. They comprise 16 pot room buildings, 2 for each potline, lined up side by side. Each "room" measures 960 feet long by 59 feet wide, and contains 72 Soderberg-type pots, or electrolytic cells, which individually produce aluminum at a rate of 40 lbs. an hour.

In this process, each pot shell is insulated with alumina and other material and then lined with carbon to serve as the cathode. A recess in this lining holds the electrolytic bath, made up of cryolite and alumina. Resting on the cathode shell is a superstructure which supports the anode, initially composed of plastic carbon paste. When the anode is progressively lowered to maintain even immersion in the bath as the carbon is consumed in the continuous reduction process, the paste is baked solid by heat from the pot itself. New paste is added from above at necessary intervals.

Cryolite and alumina are introduced in bath through hoppers and spouts on the superstructure. Overall, each pot measures about  $21\frac{1}{2}$  feet long by  $11\frac{1}{2}$  feet wide and stands 13 feet 4 inches high. The direct electric current required in the aluminum reduction process is supplied through a system of aluminum bus. Here at Chalmette, some 12,000,000 lbs. of aluminum plate have been fabricated, or will be fabricated into bus bars. Elaborate air exhaust and air cleaning systems are installed in each pot room to maintain good working conditions.

The Metal Service building connects the bases of the pot rooms and provides facilities for pouring molten aluminum into pigs up to 1,000 lbs. and handling their storage and shipping. This building measures 1650 feet long and is 63 feet wide for most of its length; at one end the width is more than

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doubled to house holding furnaces for molten metal and casting equipment.

At Chalmette two large, distinct power plants operating with natural gas as fuel have been designed and are being built exclusively to supply the tremendous quantities of electricity needed to produce aluminum—nearly 10 kilowatt hours to a pound. Together these plants will have a 478,200 kilowatt capacity. The first two potlines to go into service will be powered by the 80 Nordberg gas engines which I will describe in more detail later on. These engines are housed in a pair of two-story buildings, each 482 feet long and 55 feet wide.

The remainder of the power for this fine new smelter will come from the steam power plant. Electricity for 6 of the 8 potlines eventually to be built here and for various other plant services will be produced in a steam power plant made up of 15 steam generators, fourteen 25,000 kilowatt, and two 11,250 kilowatt turbo-generators. Of the semi-outdoor type, with the boilers located outside and the turbines in a 750 foot long building to which will be attached a large electrical bay. Also connected with the steam power plant will be a rectifier station to convert the alternating current from the generators into direct current used in the aluminum reduction process. This rectifier station will be in a building over 1000 feet long.

Immense quantities of raw material are used in aluminum production. This Chalmette plant will require each year 378,000 tons of alumina, 88,000 tons of petroleum coke, 34,000 tons of soft pitch, 6,000 tons of cryolite, 5,000 tons of aluminum fluoride, 8,000 tons of anthracite coal, and 50,000,000,000 cubic feet of natural gas, and 180,000,000,000 gallons of water for both process and domestic use.

Naturally, large installations are required to handle and produce these materials. Alumina (aluminum oxide), which is the major and basic raw material required in aluminum reduction, is supplied from Kaiser Aluminum's alumina plant at Baton Rouge, La. by rail. The rail unloading station handles two hopper-bottom cars at a time.

An elevated 24-inch belt conveyor, reaching out nearly 2,000 feet over the pot rooms, operates at 300 feet a minute and carries 150 tons of alumina an hour to the eight alumina bins, or silos, located between the potlines. The ore bins are 45 feet in diameter and 77 feet high, with a capacity of 3,500 tons of alumina. Cranes deliver ore from the bins to the hoppers feeding the pots.

Cryolite, used to dissolve alumina and form the electrolytic bath in the pots is unloaded at the same rail station as alumina and delivered by the same belt conveyor to 12 steel bins, also located between pot room buildings. Each bin is 15 feet in diameter and 77 feet high, and holds 500 tons.

The paste plant prepares the carbon paste for anodes and cathode lining in the aluminum reduction cells by blending and mixing petroleum coke, pitch, and anthracite coal into a plastic product which becomes solid carbon when baked. A

building 81 feet by 61 feet by 95 feet high contains the necessary crushing, classifying, and mixing equipment. Petroleum coke is unloaded on to a separate belt conveyor system that carries it to a group of 8 storage bins: six circular bins with 800-ton capacity each, and two star bins, each containing 350 tons. Another conveyor system transfers coke to the paste plant. Pitch is stored in two steel 160,000-gallon tanks. The pitch is heated by steam-jacketed piping to reduce its viscosity during unloading from tank cars and transference to the paste plant.

Natural gas is delivered by the United Gas Pipe Line Company through a 16-inch pipe line to the plant station which scrubs and meters the gas and reduces the pressure to plant requirements for distributing it to the power plants.

Water, an essential for a plant of this size, is supplied by a pumping plant with a total capacity of approximately 342,000 gallons per minute and is drawn from the Mississippi River which passes the

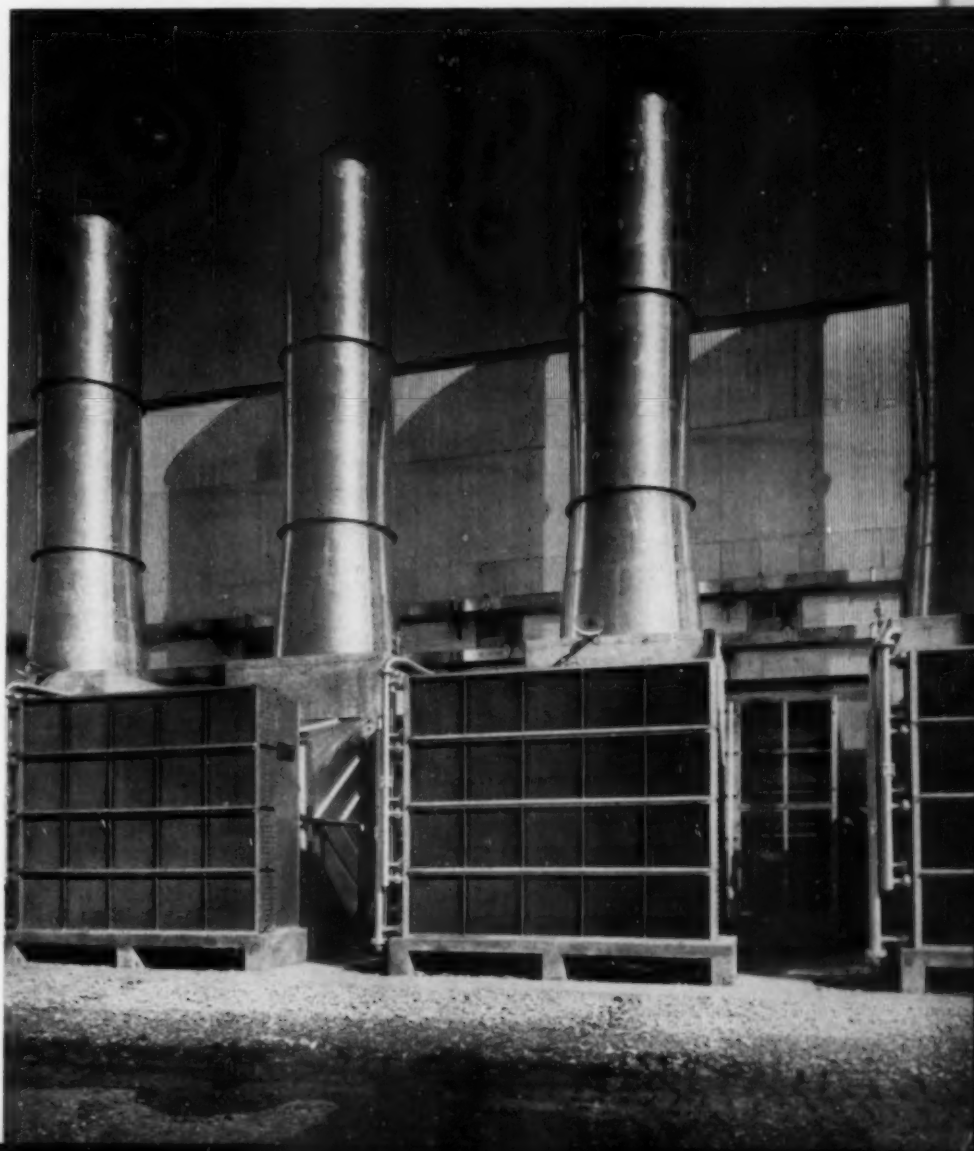
building site. A complete water treatment plant provides clear, sterile, potable water for drinking, boiler water, industrial and domestic use.

Other buildings and auxiliary facilities include administration, personnel, laboratory, washroom and locker buildings, power plant maintenance, electrical maintenance, garage, carpenter shop, machine shop and warehouse buildings, in addition to specialized shops and lunch rooms.

Our readers may notice that the rating given the turbo-generators above does not quite check with the electrical rating which I give later in the article. Now that is brought about by purely operational decisions. All of the large steam turbo-generators will be hydrogen cooled and I understand that it is planned to operate them at a slightly higher rating than the General Electric Company normally rate these units.

The Chalmette plant just outside of New Orleans is a part of Kaiser's general mine-to-metal expan-

Close-up of two of the Trane heat exchangers which handle both lube and jacket water cooling. To right and in background is Trane water-washed air filter conditioning air entering the engine room. Burgess Snubbers are located in each of the eighty stacks for exhaust muffling purposes.





sion program amounting to a capital investment of over \$200,000,000. These plans include increasing the capacity of the Baton Rouge, La. alumina plant approximately 60% over original rated capacity; adding facilities to increase bauxite production at its ore deposits in Jamaica, British West Indies; and improving existing facilities at its Mead reduction plant at Spokane, Washington, in order to increase overall capacity.

Construction in Jamaica began in February of 1951 and quantity shipments of bauxite are scheduled to begin in the third quarter of 1952. Currently bauxite for this plant here at Chalmette is coming from the Guianas in South America. The proximity of Jamaican ore reserves to the Corporation's Baton Rouge alumina plant will reduce the shipping distance by more than one-half.

The Kaiser Bauxite Company, a subsidiary of Kaiser Aluminum and Chemical Corporation, purchased an option to buy approximately 11,000 acres of bauxite properties on the Island after five years of exploration in the Caribbean area. The new mines have an annual capacity of about 1,000,000 tons of bauxite and will have an ultimate 1,250 employees. The Jamaican properties, developed at a cost of approximately \$10,000,000, will include facilities for the mining and transportation of bauxite, a 15-mile-long railroad, drying and storage facilities, two housing developments, and a deep water dock on the south coast.

The 125-acre Baton Rouge plant began a \$25,000,000 expansion on May 21st, 1951 to boost its output of 300,000 tons of alumina at that time to 800,000 tons by mid-1953, and increase its employment to approximately 1,000 persons.

Back in the July 1950 issue of DIESEL PROGRESS I described at some length the installation of 120 Nordberg radial gas engines at the Point Comfort, Texas smelter of the Aluminum Company of America and I am now going to briefly tell you of the difference between the engines installed at Point Comfort and the ones installed here at Chalmette.

In each case they are 11 cylinder units, 14-inch by 16-inch and at Point Comfort they operated at 360 rpm. and rated at 1600 hp. each. Here at Chalmette Kaiser has 80 of these engines and they are rated at 400 rpm. to deliver 1820 hp. for a total of approximately 150,000 hp. in the two engine rooms. Each generator is rated at 1290 kw. d.c. As you will note later in the electrical description, because it is possible to get a.c. current here independent of the gas engine power plant, the engines are driving only d.c. generators.

The heat exchangers for the lube oil and for the jacket water are the same general type as at Point Comfort, both contained in the same unit. The question of heat exchange here at Chalmette is a colossal job. Each engine works up a heat load of nearly 3,000,000 British thermal units in an hour—2,743,000 btu. per hour to be exact, transmitted to the jacket water and lube oil. Thus, the engine cooling is, as I said, a problem. Then another problem here is providing an adequate supply of air for the engine room. About 17,000 cfm. are lost through combustion and exhaust of each engine;

another 12,700 cfm. are exhausted by each of 80 fans in the generator room. This air, properly filtered and tempered, must be "made up" to maintain proper pressure in the room. To solve the first problem, cooling the jacket water and lube oil of the 80 engines, there are 80 Trane dry type fluid coolers. Each of these units consists basically of two fin and tube coil circuits through which oil and water flow, and a propeller fan which draws air over the coils. Jacket water and oil flow in separate three-row coil circuits, each forced by separate circulating pumps. Air at temperatures up to 100° is drawn over the coil circuits. This air flows first over the oil circuit, cooling oil from 147° to 127°. The heat load from the lube oil of each engine is 713,000 btu. per hour. After passing over the oil circuit, the air flows over the jacket water coils, cooling the water from 135° to 145°. The jacket water load of each engine is 2,030,000 btu. per hour. The 81 inch, six-blade fan is driven by a two-speed 25 hp. motor at top speed, with higher entering air temperatures, the fan runs at 720 rpm., with a volume of 78,000 cfm. When the air temperature drops, the motor is manually shifted to second speed, 360 rpm. This results in a 39,000 cfm. output to maintain design conditions and corresponding savings in horsepower requirements. Fan blades are adjustable in pitch to vary air flow in order to meet seasonal temperature variations.

On the air inflow, 80 all-aluminum Trane air washers handle the job of supplying "make-up" air to the engine room. Each of these units provides 35,000 cfm. of filtered ventilation air to compensate for the 30,400 cfm. used and exhausted by each of the 80 engines and exhaust fans. Thus, a slight positive pressure is maintained in the engine room.

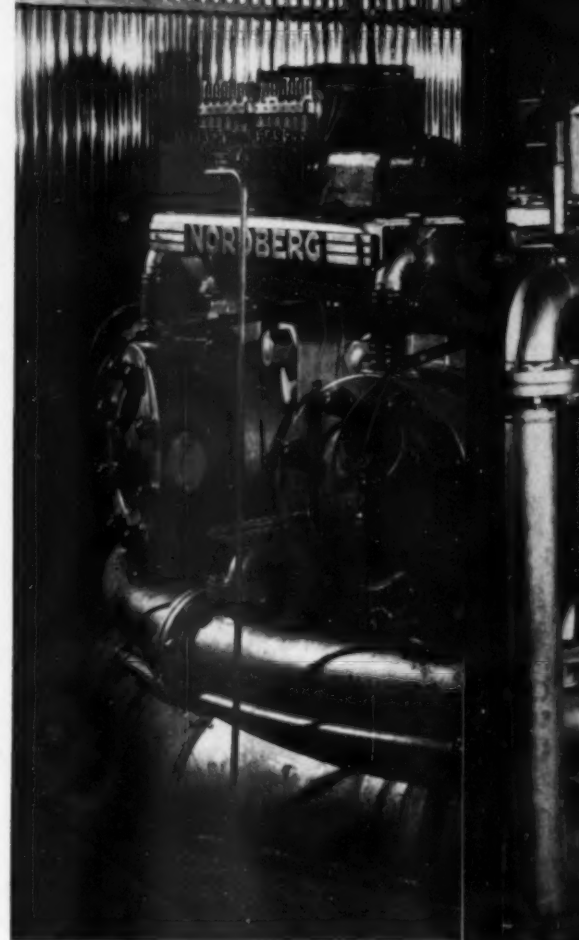
Air, mixed with spray water, is drawn by a propeller fan through the flow passages of the brazed aluminum air washer. The spray water picks up 99% of the fine aluminum dust particles that may be present in the air as it flows through the washer. Six water "brakes" act as baffles in the unit to prevent excessive water loss as the air leaves. Some evaporative cooling is also accomplished as the air passes through the aluminum washer. Entering air at 100° dry bulb is cooled to 78.5° dry bulb. The wet bulb temperature, 75°, does not change. The air washer has a closed spray system, with a 175 gpm. pump, powered by a 2-hp. motor.

Now we have brought the air into the engine room through the washer, but there is still a big job to do before it gets into the 80 engines and that job is handled by 80 American Air Filters type #9-PL-H installed on the engines at the scavenging blower intake. This is very similar to the installation at Point Comfort where these American Air Filters have been working to complete satisfaction for a year and a half. These are known as the Airmat type air filters of the dry-type which not only do a top notch job of air filtration but eliminate a reasonable amount of moisture due to excessive humidity which frequently occurs down here in the southern part of Louisiana.

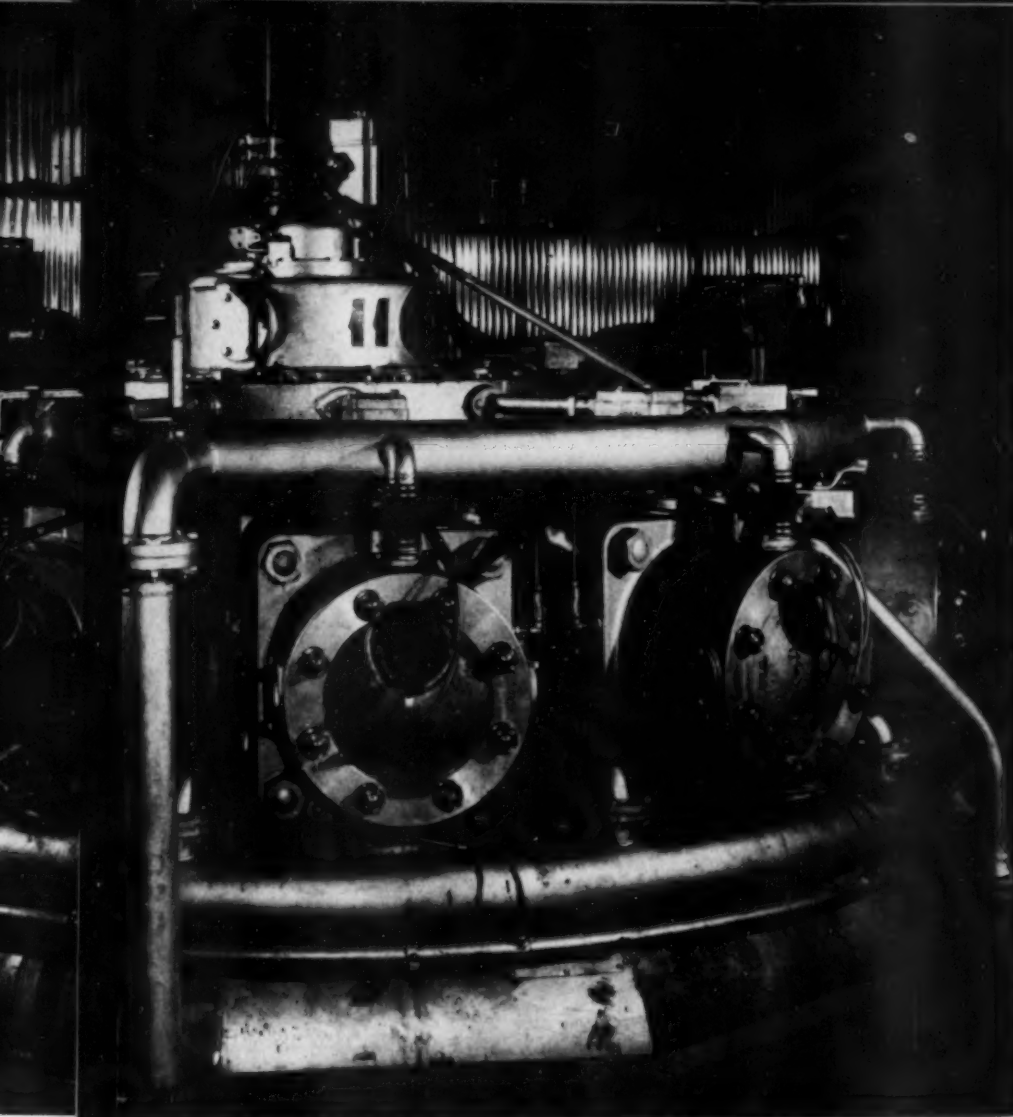
The same general type of high pressure scavenging blowers are installed here at Chalmette as are in use at Point Comfort, namely Buffalo Forge Company's #8E high pressure blowers with welded

steel wheels overhung on a shaft of 125 hp. 3600 rpm. G.E. electric motors. Heavy cast iron housings give efficient performance at high pressures and air velocities with minimum noise. Then the Buffalo Forge Company also supplied 80 of the 54 inch tubeaxial fans with cast aluminum wheels and 7½ hp. electric motors for the fresh air supply and in addition supplied 64 one hundred inch MW fans for V-belt drive of 75 hp., 1200 rpm. electric motors for pot line exhaust.

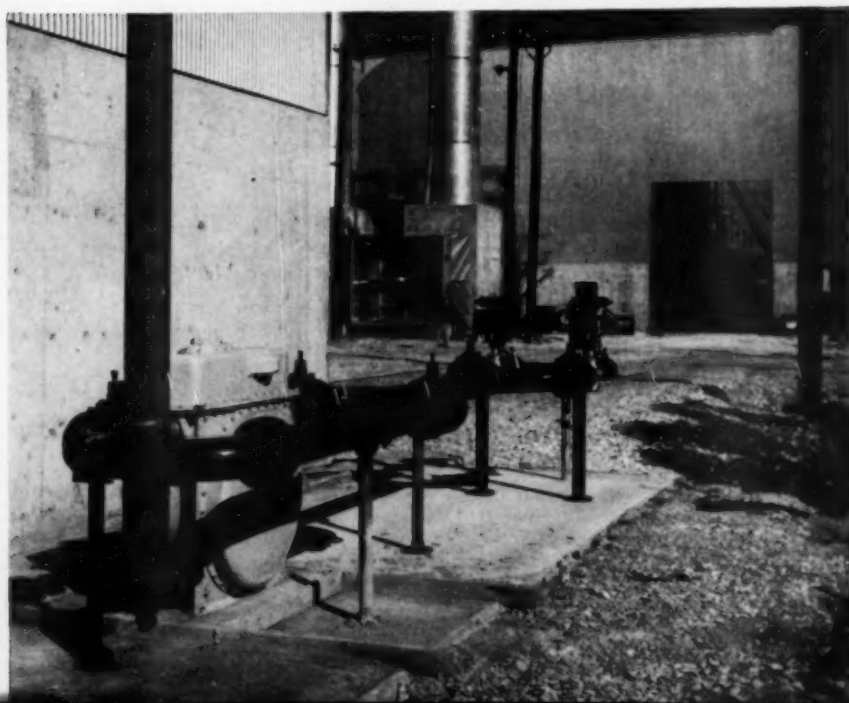
Getting back to the Nordberg engine itself, we have just about the same top hamper equipment as we found at Point Comfort, namely a pair of Manzel model 82-D lubricators on each engine which play such an important part in lubricating the top end of each of these 80 machines. Then we find the American Bosch equipment here again at Chalmette consisting of a pulse generator which produces exactly timed low-tension pulse of current, a high tension dual ignition distributor, two high tension coils, and two rectifiers. The only difference at Chalmette is that the distributor







Close-up of Nordberg radial gas engine in plant number one. Two Manzel force feed lubricators with G-E motors on each engine. Bosch ignition system and spark plugs. Woodward governor at top. Below—Emco-Rockwell gas meter and pair of Mason-Neilan gas regulators—a set for each plant.



is mounted here directly on the pulse generator and operates from it through reduction gearing.

The pulse generator operates at  $2\frac{1}{4}$  times engine speed in order to deliver the eleven sparks per engine revolution required. The distributor operates at engine speed through reduction gearing in the gear box. Two sparks per cylinder spaced 7 crankshaft degrees apart are required in the Nordberg 11-cylinder radial engine for best operation. Then the other top hamper unit is of course the well known Woodward governor which is the same here as at Point Comfort.

The control cubicles here at Chalmette are slightly different from those at Point Comfort, mainly the Sensitrol has been eliminated and emergency shut-downs are achieved by relay trips. The outstanding feature on this control cubicle is still the Alnor pyrometer which combines a motor-driven switch. This continuously operated pyrometer reads the exhaust temperature of each of the 11 cylinders automatically and should any cylinder reach a predetermined high level, a relay is tripped and the engine shut down.

On this same control board is found the Frahm tachometer and the Meriam manometer. The general operation here is that the engine cannot be started unless all of the accessory units are in full operation. In other words, the scavenging blower is started, the air intake fan is started, the Trane heat exchanger for lube oil and cooling water is started, and all of the accessory lights have to show white on the board before the operator can press the start button. Then on the reverse action, any of the troubles which might beset an individual engine are handled automatically by the trip relay protective system, such as low oil pressure, high water temperature, high exhaust temperature, over-speed of the engine, high generator temperature, or loss of auxiliary power. All of these things automatically trip a relay and shut down the gas supply.

The operator on the floor has a simple signal system to work on. All operating engines have a large light burning at the top of the cubicle. He knows how many engines that he has on the line and how many engines off, and when he sees one of his operating engines showing a down light, he goes to the Board and the piece of auxiliary equipment which doesn't show a white light is the one that caused the trouble and the one that has to be fixed. The engine room crew here is uncomplicated and very efficient. There is one shift foreman for the two engine rooms and there is one control operator in the room which is built between the two engine rooms and then there is one man on the top floor of each engine room and one man on the bottom floor of each engine room so you have six men in your crew for each shift handling 80 engines, producing approximately 150,000 hp. continuously.

There is one thing here that we didn't have at Point Comfort and that is the Burgess snubbers. There wasn't any too much need for silencing of the exhaust in the Alcoa plant at Point Comfort, but here at Chalmette, the Kaiser plant is closer to residential sections and it was considered advisable

to quiet down the exhaust noise of these 80 engines and the Burgess snubbers mounted inside the stacks do the job and do it very well.

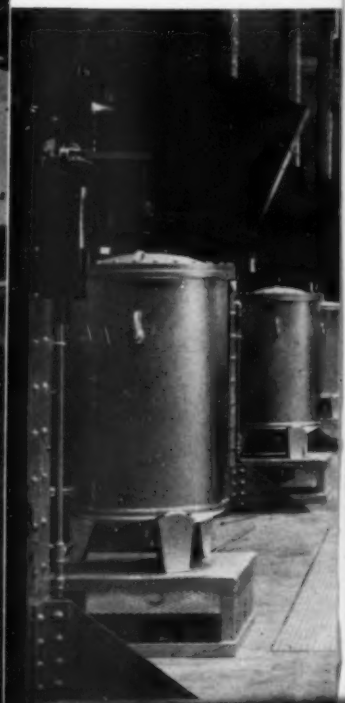
The handling of lube oil is quite different here from the Alcoa plant at Point Comfort. There is a pair of 26,000 gallon lube oil storage tanks outside and then inside each building there are four auxiliary storage tanks at the end, each 5,000 gallons, two for clean oil and two for dirty oil. Then we find four cylinder oil storage tanks of 500 gallon capacity, mounted amidship of each engine room on each side and down in the basement we find 40 sump tanks in each building, 750 gallon capacity, and these incidentally are aluminum

View of Nordberg engine shop number one looking north. 40 engines. This unit not in full operation when photo was taken.



This view catches all but two of the engines at Chalmette, La. Control cubicles with engines on top visible or not.

Unique view looking down aisle between the Nordberg radial gas engines. This is one of the eighty gas engines in the building.





Nordberg Engine Building looking South, your editor, Rex W. Wadman, in foreground. These engine buildings are without windows.

tanks and all the piping for the oil system is aluminum. There are 80 Honan Crane lube oil purifiers in this plant at Chalmette, 40 to a building, working on a by-pass system and at regular intervals, the sump tanks are drained, turned into the dirty oil tanks at the end of the building, allowed to settle for a reasonable amount of time, and then put through two big Sharples centrifugals in the basement, and returned to the clean oil tanks for service. DeLaval Imo 165 gpm. lube oil pumps are used to keep the lube oil moving operated by 10 hp. General Electric motors, and a group of DeLaval Imo pumps are also used for lube oil transfer from the main supply tanks outside the building into the clean oil and clean oil storage.

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nty of the Honan Crane lube oil purifiers  
is one Honan Crane unit for each of the  
buildings currently operating.





Outside of each of the Nordberg gas engine buildings we find a large Emco gas meter made by Rockwell and a pair of Mason-Neilan gas regulators.

The production of aluminum pig is a chemical process, and takes place in electrolytic cells, or "pots." A group of pots, electrically connected in series, is called a potline. The raw materials consumed in the process are alumina (aluminum oxide), carbon (the electrode material), and electricity. Approximately two pounds of aluminum oxide,  $\frac{3}{4}$  lbs. of carbon, and 10 kilowatts are needed to produce one pound of aluminum.

Because of the importance of the power component in the total cost of aluminum reduction, reduction plants have usually been located in areas of cheap power. The hydro-electric developments of TVA and the Pacific Northwest have provided most of the power for the country's aluminum production.

When Kaiser selected the location for this new plant, the object was not only inexpensive power, but also power available in a hurry. To meet these requirements, Kaiser generates his own power using for fuel the natural gas readily available in this New Orleans area.

Currently two potlines will be put in operation (one is already operating from Nordberg gas engine plant building #1) and the second potline of course will operate from Nordberg building #2 when the engines are ready for full service. Then two other potlines will be served by the steam plant which is being built immediately adjoining the gas engine plant. These four potlines will be operated so that each absorbs about 50,000 kw. (approximately 70,000 amperes at 700 volts) and producing 50,000,000 lbs. of aluminum pig each year. As already stated two of these potlines are to be supplied by turbine generators and rectifiers

and the other two from the Nordberg engine driven direct current generators.

Delivery on Nordberg engines and General Electric generators began six months after the placing of the orders. The 10,000 kw. and the 20,000 kw. turbine-generators are scheduled for a period between 12 and 16 months after ordering. It probably would have been the plan to have used 40,000 kw. turbine-generators in a plant of this size but delivery could not be obtained for some 3 or 4 years from the time that the plan was made. So, we have here a combination of roughly 150,000 hp. of Nordberg gas engines driving General Electric generators and adjoining it a power plant of approximately the same size made up of turbine-generators using local Louisiana natural gas as fuel. It will be interesting to tabulate the actual production cost of a kw. with gas-engine driven generators and turbine-driven generators—an opportunity which will of course exist in this plant from now on.

For a diagrammatic representation of the electric power flow and the quantities required in pot rooms, and for auxiliaries, see Figure 1. Practically all of the electrical equipment is coming from General Electric Company who are supplying amongst other things five 20,000 kw. turbine-generators, two 10,000 kw. turbine-generators, 13.8 kv. switch-gear and control for the power house, eighty 1290 kw. d.c. generators, one hundred and sixty generator breakers, eighty engine generator control cubicles, four 200 kw. generators, and amplidynes for main generator excitation, two regulating auto-transformers rated for 60,000 kva. circuits and of course a great variety of associated transformers, motors, switchgear, control and metering equipment. The total selling price of the General Electric equipment in this project is estimated at \$12,500,000 and that just covers, of course, the two gas-engine-driven potlines and the two turbine-generator-

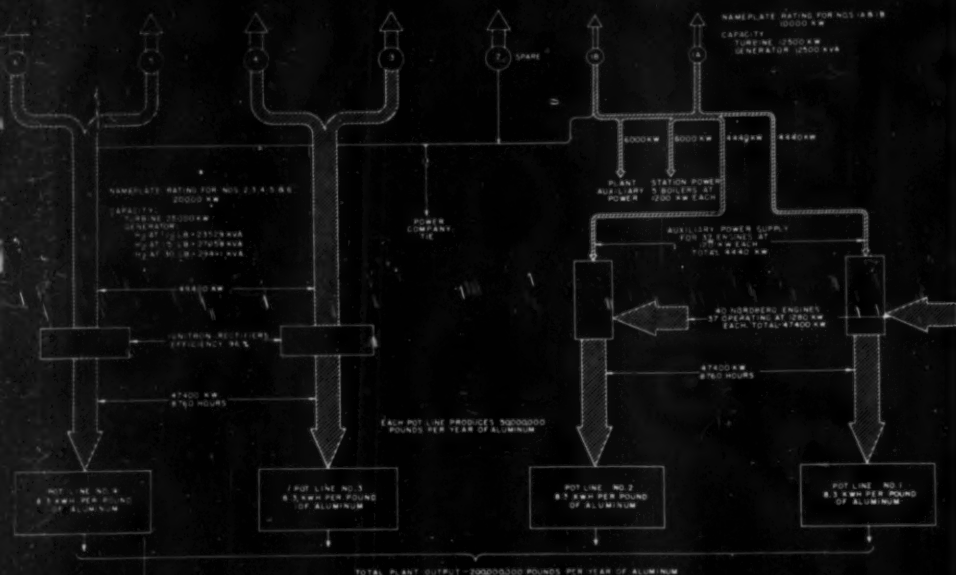


View looking through service door at bottom of generator housing, looking up into the generator rotor, 80 General Electric 1290 kw. d-c generators in this huge plant. Vertically supported under each engine. There is a ventilating fan under the grill here pulling the air down over the generators and then out to atmosphere.

driven potlines. It does not take into consideration the power which will be required for the remaining half of the plant which will be all turbine-generator-driven, with a total of some fourteen 20,000 kw. turbine-generators.

The potlines getting current from the engine-generators are currently in operation, or at least one of them is. The Nordberg gas engines are rated at 1820 hp. at 400 rpm. and are radial engines of the two-cycle type with eleven cylinders of 14-inch bore and 16-inch stroke. Because of the abundance of natural gas fuel in this Southern Louisiana area, these engines are of the gas burning type, incorporating an advanced design spark ignition system.

Each engine develops 1290 kw. and there are 80





of them in two engine rooms, operating 24 hours a day, day in and day out, in what is currently, Louisiana's largest internal combustion engine power plant. This Nordberg radial engine is designed to give simple, compact, economical power and their ability to burn natural gas efficiently permits these two engine rooms to produce power at a very low cost which will compare favorably with generating cost of hydro-electric power, or steam power.

Cylinders of these gas engines are equally spaced on a horizontal plane and radial around a vertical shaft. The cylinders fire in consecutive order. Good balance is achieved by actual convergence of combustion pressures and inertia forces at one focal point on the crankshaft axis. This results in a vibrationless engine which permits the use of the simple, inexpensive foundation—down to 20% of usual requirements. The compact cylinder arrangement reduces engine floor space to about one-half the usual requirements of a vertical engine and also permits the engine to be transported as a complete unit from the factory in Milwaukee to this site here in Chalmette.

Each direct-current electric generator of 1290 kw. 700 volts is mounted directly below the engine and is connected by a coupling. This method of generating direct current eliminates the need of building rectifier stations with the consequent losses that occur in rectifying alternating current to direct current. Each engine-generator unit has its own control cubicle including starting relays, engine instruments, and protection equipment. The protective equipment shuts off the engine automatically in the event of high water, high exhaust, or high generator temperatures, low oil pressures, or low auxiliary power.

In addition to these unit control cubicles, each of the two power houses here at Chalmette has a master control room so that the overall operation of the 80 units can be observed and the load governed as required. This control room is located midway between the two power houses and it is possible to shunt power from one power house over to the other before feeding it into the pot-lines. Normally there are three spare engines not in operation in each power house. In an emergency all engines of one power house can operate and six engines can be idle in the other one and the control house between the two equalizes such a situation.

With each engine-generator, there is required 160 hp. in auxiliary motors. These are rated at 440 volts, 3 phase, 60 cycles, and are supplied from load center sub-stations in the conventional manner for industrial plant loads. The 480 volt systems are all grounded being supplied by transformers rated at 500 kva., 13,800-480 Y/277 volts.

Figure 3 is a diagram showing the arrangement of equipment for one engine-generator line. Of the 40 engines, it is expected that 37 will be operating at all times. The three that are shut down will be undergoing routine maintenance, or just acting as stand-by. Each generator delivers its power through two circuit breakers, one for each side of the line. The negative line breaker is a conventional d.c. single pole breaker. In the positive line is a single pole, with high speed tripping capability on reverse current. With such a high capacity d.c. it is vitally important that the generator be immediately tripped off the line in case of internal halt, flash-over, or trouble in the generator leads. So, one of the 200 kw. generators supplies excitation for all generators on the line. The

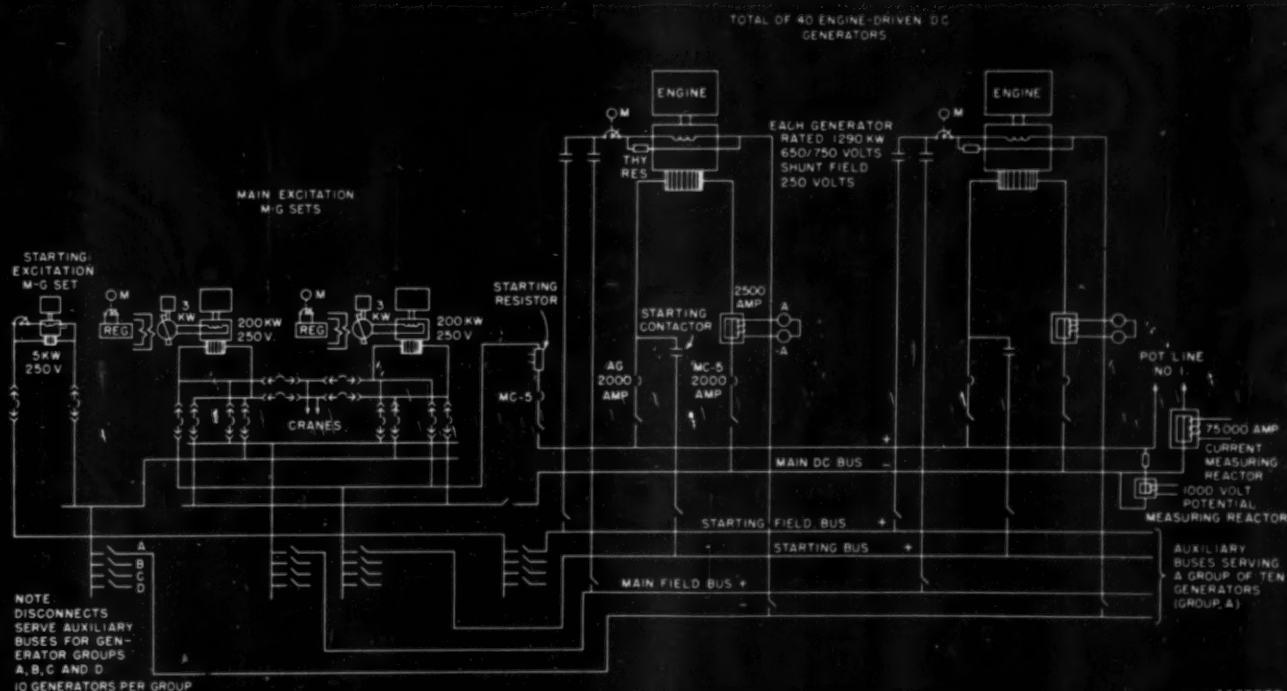
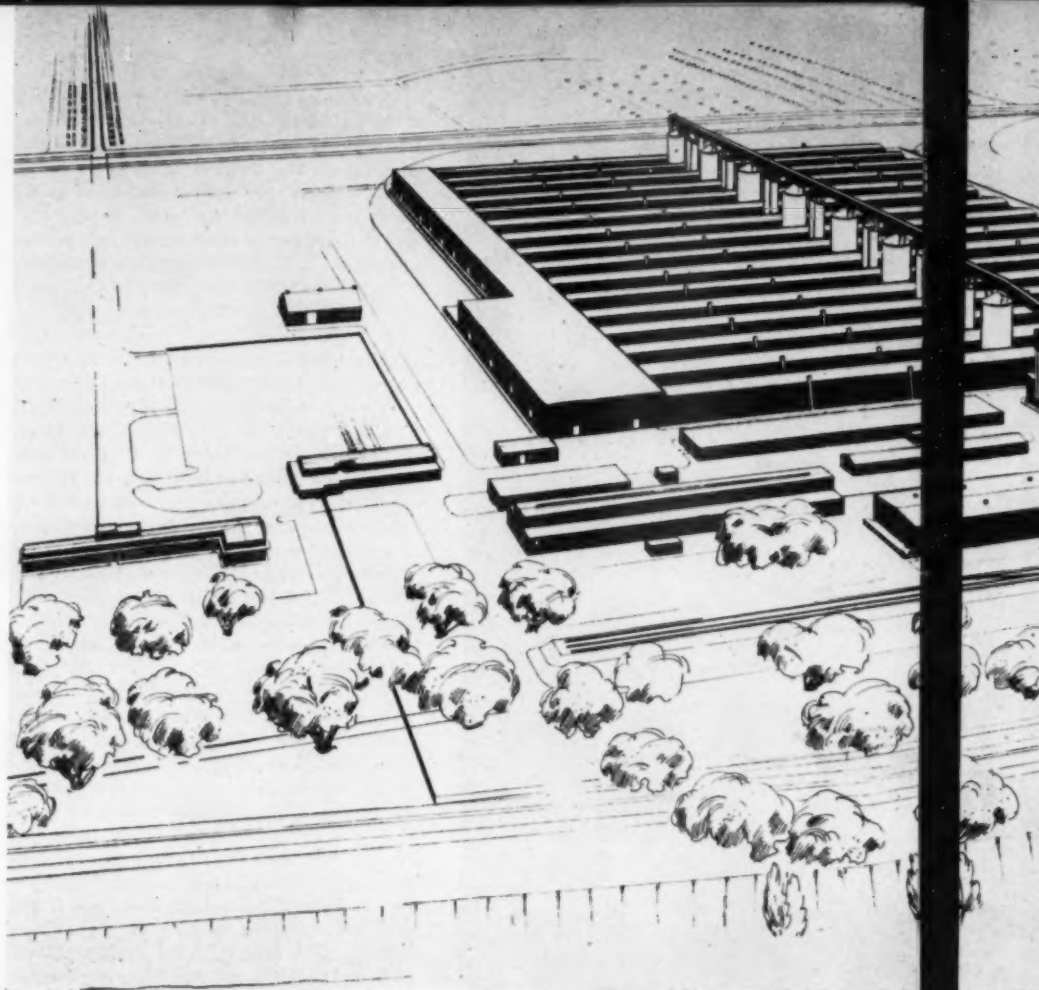


Fig. 3. Diagram of engine-generators and associated electric equipment for one potline

other is a stand-by. In preparing a cell line, for production, or "baking out the potline," operation at reduced voltage is necessary. To get the necessary voltage control, amplidynes are used to excite the main exciters. The excitation system is also set up for automatic operation, holding a selected value of either current or voltage. The potline current is measured by a 75,000 ampere current measuring reactor. A recording ammeter which keeps a chart record of total potline current also contains the potentiometer whose position changes with the current. This potentiometer, then provides a feed back signal to the regulation circuit. Amplidynes are not used for their low voltage alone, principal use is their great flexibility in voltage control.

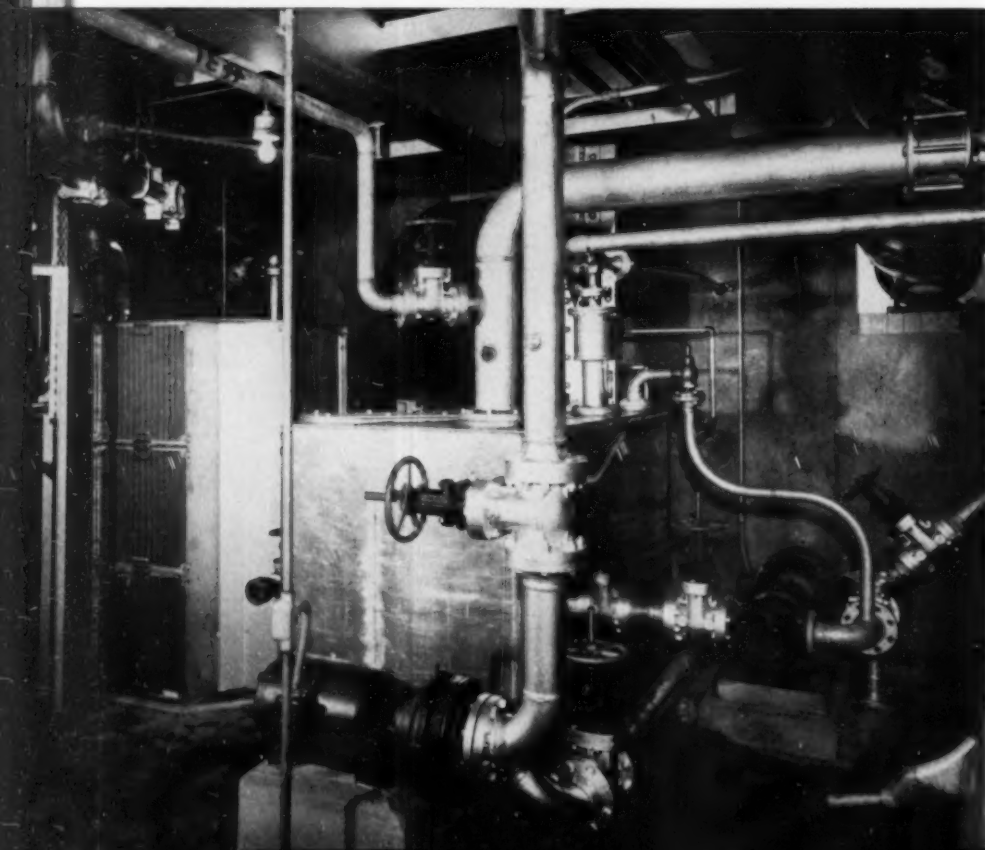
When voltage is to be held, the operation is similar but output voltage is measured by the potential measuring reactor. This device is similar to the CMR. A resistor is connected across the positive and negative lines, and the shunt current is measured by a CMR, calibrated with voltage metering equipment.

The voltage control provided by the amplidynes performs another valuable function in eliminating the need for main potline breakers. In the past, when d.c. generators or rotary converters were used, they had to be paralleled while disconnected from the potline. Then the potline breaker would close them in on the load. When shutting down, the potline breaker first interrupted load current and then individual machines could be taken off the bus. In this plant the first generators on the line are at very low voltage and so are not overloaded by the potline which appears almost as a short-circuit to an individual generator. On shut-



Accessory bay in basement, Allis Chalmers water circulating pump in foreground. To right is the DeLaval lmo lube oil pump, in center the lube oil sump tank and at left American Air Filter "Airmat" air filter for engine air intake. This unit is duplicated 80 times in the two engine buildings.

General view of the Kaiser Aluminum & Chemical Company's plant at Chalmette, La. as it will look when completed.



down, the current from the generators and to the load can be reduced almost to zero before opening the generator breakers. Since a 75,000 ampere potline breaker would be a monstrosity physically and a hazard in operation, its elimination has been greeted here at Chalmette with loud cheers.

The engines are started electrically, using the main generator as a motor until the set reaches a speed that allows the engine to fire and take over. The cubicle located near each engine contains protective and alarm devices, instruments, and starting equipment. An operator at this cubicle starts the set, parallels it with the running machines on the potline bus, and then transfers voltage control to a master control panel. Several different starting routines can of course be used.

The normal starting procedure here at Chalmette is that of restarting a set that has been down for inspection or maintenance. The potline is operating in normal voltage (700 volts) and the main field bus is operating at something near full 250 volt excitation voltage. The incoming generator field is then connected to the main field bus which is being supplied by one of the exciters. The armature is connected to the potline bus, through a resistor, and draws accelerating current from the

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This view shows the plant as it will look after all the steam generators and turbines have been installed. 8 potlines will then be serviced.

Another view of the accessory bay at Chalmette plant. One of the eighty Buffalo Forge scavenging air blowers in right foreground. Generator housing to right foreground. Allis Chalmers motor and pump on jacket water line and the 750 gallon lube oil sump tank.

generators already on the line. The connection to the positive line through the resistor is made with a contactor that by-passes the reverse-current tripping breaker.

When starting the first engines, each incoming machine gets its accelerator armature current from the second exciter. The control provides a smooth start, with gradually increasing armature voltage. However, the resistors start, taking current from the bus, is simpler and probably will be used whenever the number of running machines is large enough.

Of course these first two starting methods depend on full voltage being present on the main field bus. During the period when the new cell line is being "baked out" at low voltage, the main field bus voltage is too low for the field of a machine being started so a third exciter, a 5 kw. starting excitation set is necessary. During periods of low main excitation voltage, this exciter puts full voltage on the starting field bus. The armature can then be supplied by either the second main exciter or the potline bus.

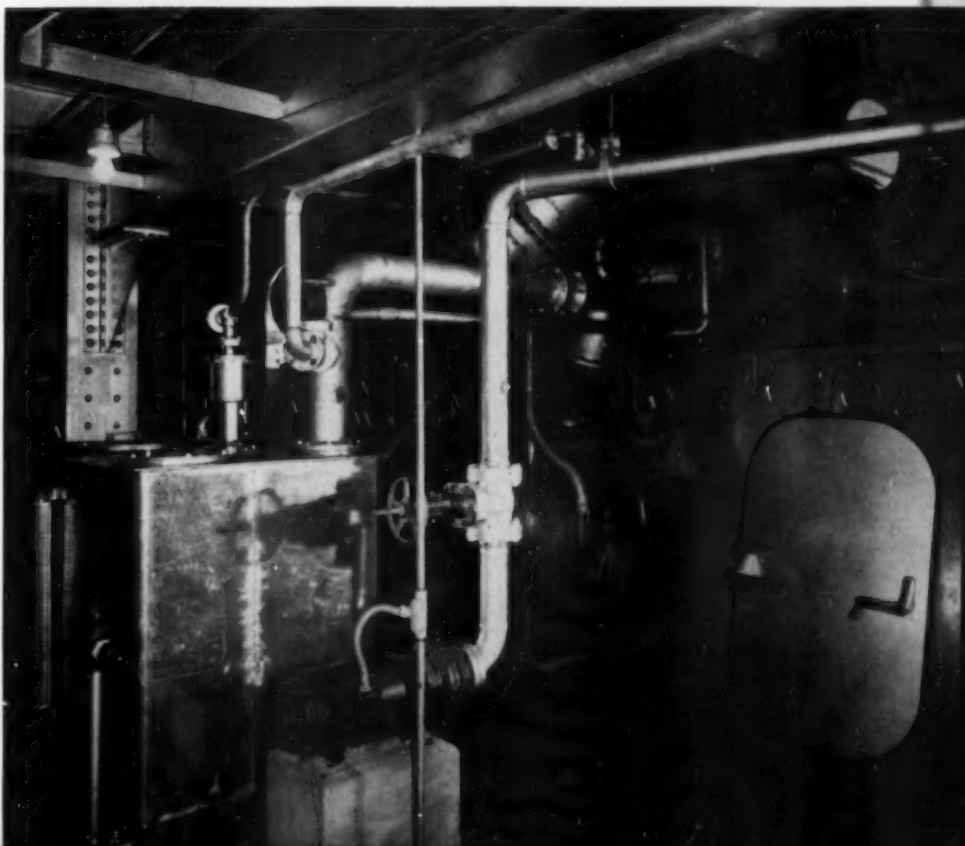
An unusual characteristic of the current measuring reactor is that the ammeter deflects up scale for

both directions of current flow. This feature is a useful one here; while the generator is acting as a motor and drawing reverse current, the ammeters still indicate armature current.

The current supplied to the potline is controlled from a single master control panel. Since one exciter supplies the fields to all running generators, control of the associated amplidyne conveniently gives total potline current or voltage control. The master control panel also includes for each engine-generator: push button control of a motor operated trimming rheostat in the generator field, an ammeter, and an indicating light to show that the set is running and that control is at the master panel.

An emergency stop button, instruments reading potline volts and amperes, control for a 15,000 ampere tie circuit between potlines, and the automatic voltage and current regulation equipment are also located at this central control point.

Of course it should be remembered that there is a slight difference between the 80 engines in this Kaiser-Chalmette plant from the 120 Nordberg radials installed at the Point Comfort, Texas plant which I described in the July 1950 issue of DIESEL PROGRESS. At Point Comfort, because there is no high line power available at a reasonable price, it was necessary to design the plant to produce a limited quantity of a.c. current in addition of course to the large quantity of d.c. current needed, so the generators at the Point Comfort plant are partially d.c. and partially a.c. Here at Chalmette where high line power is available at a low cost they buy their a.c. requirements currently for operating the amplidyne system of starting or excitation. When



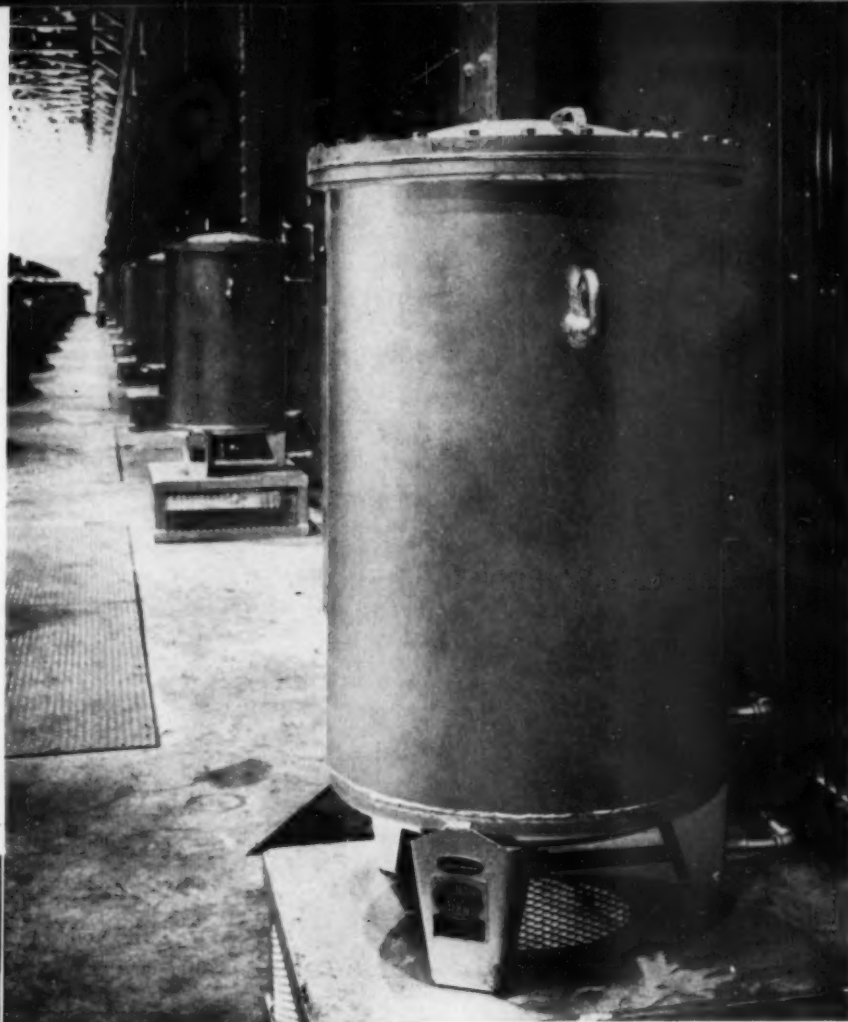


their steam plant goes on the line, the 10,000 kw. turbine-generators will supply sufficient a.c. current for all requirements of the plant. Consequently, the 80 gas engine-driven generators here are d.c.

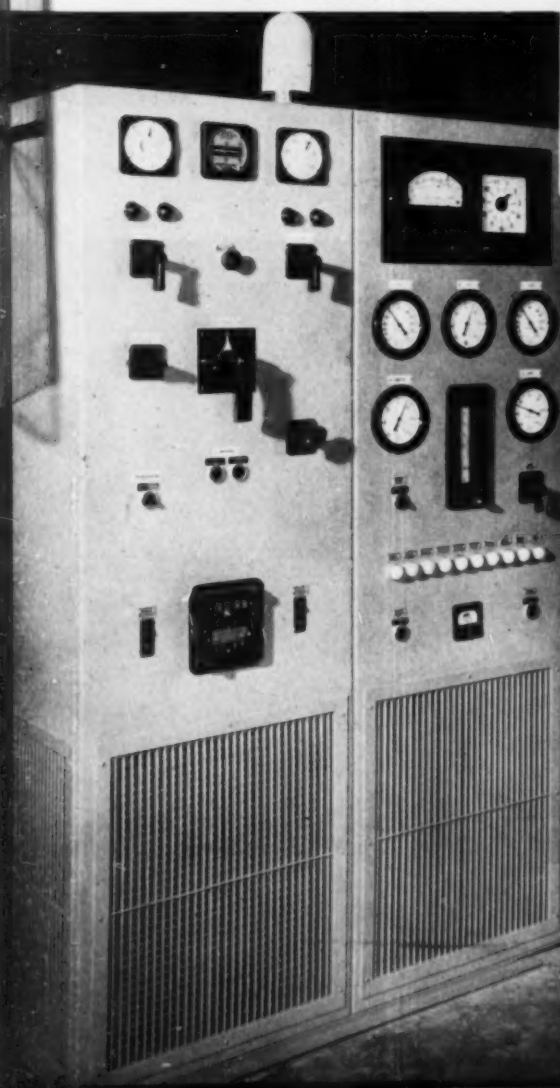
I failed to remind you readers that of course the a.c. requirements in this Chalmette plant go beyond that of the amplidyne and into the operation of the auxiliary equipment and total up to a substantial a.c. requirement figure.

It has been a very interesting and worthwhile experience to visit here in Chalmette, spend three days in this fine plant and to write up its description for you, our readers. I want to express my sincere appreciation to Mr. W. W. Watkins, General Superintendent, Power Division, of Kaiser Aluminum & Chemical Corporation and also to Mr. F. W. Douville, Operating Superintendent, Nordberg Engine Buildings. Both of these men proved of inestimable help to me in supplying the technical information that I have been able to incorporate in this article and also made it possible for me to take the fine pictures which illustrate this article.

Control cubicle for each of the eighty engines contains, on right segment, Alnor pyrometer with rotating switch; five U. S. gauges and Meriam manometer. On left segment, Frahm-Biddle tachometer and General Electric gauges and controls.



Close-up of the line of Honan Crane oil purifiers, one for each engine, eighty in all here at Chalmette.



#### List of Equipment

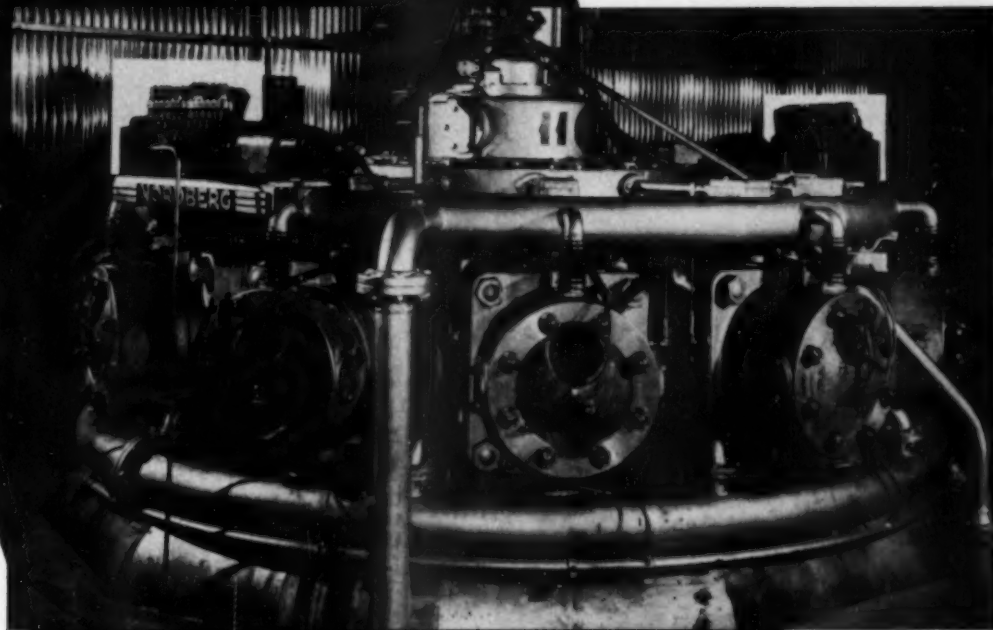
Engines—Nordberg, radial, 11 cylinder, bore 14 inches, stroke 16 inches, 1820 hp./400 rpm.  
Generators—General Electric Company, 1290 kw. d.c. 400 rpm., 700 volts.  
Exhaust Silencers—Burgess-Manning.  
Intake Air Filters—American Air Filter Co.  
Intake Air Washers—Trane Company.  
Lube Oil Coolers—Trane Company.  
Jacket Water Coolers—Trane Company.  
Scavenging Blower—Buffalo Forge Co.  
Potline Exhaust Fans—Buffalo Forge Co.  
Fresh Air Supply Fans—Buffalo Forge Co.  
Lube Oil Pumps—DeLaval Imo.  
Lube Oil Transfer Pumps—DeLaval Imo.  
Lube Oil Purifiers—Honan Crane.  
Lube Oil—Gulf Parvis "H."  
Cubicle Gauges—U. S. Gauge Co.  
Gas Meter—Emco. Rockwell Manufacturing Co.  
Gas Regulators—Mason-Neilan.  
Tachometers—James C. Biddle Co.  
Centrifuge—Lube oil—Sharples Corp.  
Alarm Systems & Control Cubicles—General Elec.  
Jacket Water Pumps and Motors—Allis Chalmers.  
Governors—Woodward Governor Company.  
Cylinder Lubricators—Manzel.  
Ignition System—American Bosch.  
Pyrometers—Alnor. Illinois Testing Labs, Inc.



# Naturally

## IT'S MANZEL FORCE FEED LUBRICATION

*In the Kaiser Chalmette Plant  
described in this issue*



Eighty Nordberg 1820 Horsepower eleven cylinder radial gas engines are installed in the huge new Kaiser Aluminum plant at Chalmette, Louisiana. Each of the new engines is equipped with two 12 feed Manzel Model 82 Force Feed Lubricators...a total of 160 individually motor driven units. Especially adapted for use on these new and revolutionary engines, the lubricators supply an accurately metered amount of oil to engines cylinders with unfailing regularity. "Manzels" drastically reduce labor, maintenance, and overhead costs. Over 50 years they have proved their dependability, accuracy, and economy.

*Naturally*, in this great plant, as in the majority of power plants it's *Manzel Force Feed Lubrication*.

In the extensive line of Force Feed Lubricators there is a model to meet *your* needs. For the best in lubrication always call on . . .

# Manzel

275 Babcock Street  
Buffalo 10, N. Y.

# TUNA CLIPPER "COLUMBIA"

**Puget Sound Boat Building Corporation  
Completes the Last of the Current Crop of  
Tuna Clippers**

By CHARLES F. A. MANN

ONE of the last Clippers to be completed for San Diego interests by the busy Tacoma boat yards, is the trim, exceptionally stable wood and diesel *Columbia*. Puget Sound Boat Building Corporation, and Architect James Petrich have turned out an exceptional medium size Clipper for Messrs. Frank Perry and Ed Madruga and Associates of San Diego. Delivery was in early November.

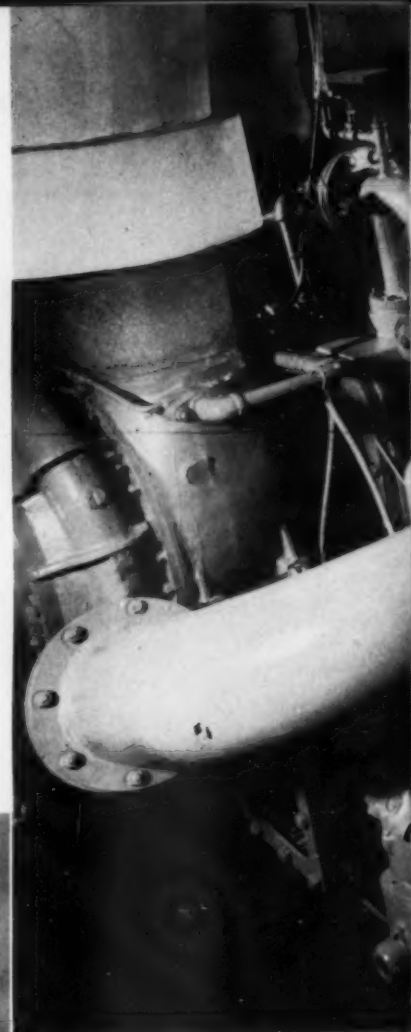
*Columbia* was specified from the beginning to be an especially stable boat, more than the average clippers, as a definite request by the owning syndicate and Capt. Frank Valin, skipper. Hard over at full speed, either port or starboard, *Columbia* showed less than a 5 degree list.

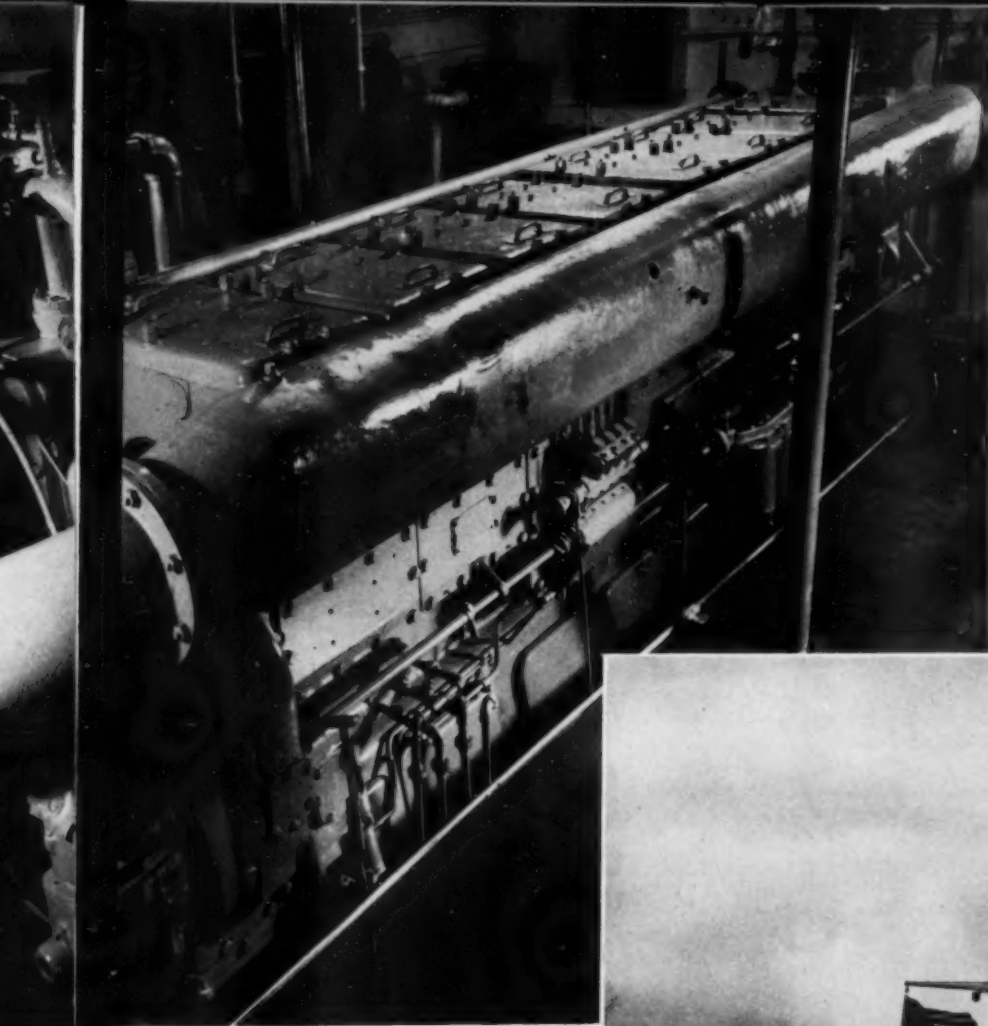
She is 107 x 26 x 14.6 ft. draft and 13 ft. depth,

and packs 210 tons of frozen tuna in 13 wells, including three in the compartmented deck baitbox. An unusual watertube is provided to flume the live fish from the upper deck level to the various wells, thus preventing injury to the fish until they are packed in the brine wells and frozen solid. Four of the wells are combination fish and fuel tanks—fish on the inbound and fuel outbound. Total gross fuel capacity is rated at 28,000 gallons.

Main propulsion is an 8 cylinder Cooper Bessemer diesel, which is not only direct reversing but with full air operated controls, both in the pilot house and in the engine room. It delivers 650 hp. at 450 rpm. and swings a 64 x 38 Coolidge propeller, giving the vessel a speed, fully loaded, of between 10 and 11 knots.

56





Eight-cylinder Cooper-Bessemer main power plant, rated at 650 hp. at 450 rpm., aboard the tuna clipper *Columbia*.



Twin 200 hp. GM auxiliary diesels, turning 100 kw. Fairbanks Morse alternating current generators, deliver power at 110-220-440 volts via transformers, for large and small motors, galley equipment and lighting. Both main and auxiliary diesels are full air starting, with no secondary auxiliary generator or battery set being employed. Large capacity air bottles and operating practices keep at least one diesel running at all times. Some consideration is being given for installing a small diesel air compressor, in space already provided, for starting air after or during layover periods.

All pumps are Fairbanks Morse, including 11-2½ inch brine pumps and 2-10 inch bait pumps. The elaborate electric switchboard was built in the yard shops. Refrigeration is by three 5½ x 5½ Howe ice machines and a smaller 3½ x 3½ Howe unit for the 5 walk-in galley boxes. A Lang range is fitted, as well as full automatic Photo Electric Pilot steering; Raytheon radar; 5000 watt radio; Intervox Direction Finder, etc. Crews' quarters for 13 are provided.

57





# AIR-COOLED AIRCRAFT DIESEL ENGINE

**No Heavier Than Its Gasoline Counterpart,  
It Effects Greater Fuel Economy and Safety**

A new era was marked in the light aircraft industry, and in aviation generally, when Diesel Power, Inc. made its first public test flights of its revolutionary four cylinder, opposed, aircooled, aircraft diesel engine mounted in a model 18 Taylorcraft airplane, with Ray Kirschler, Chief Taylorcraft test pilot, at the controls. The engine was invented by Fred A. Thafeld who designed and built the radial engine used in the M-3 tank during World War II. The plane, built to Army specifications, soared over this Ohio River valley, 22 miles west of Pittsburgh, for a series of public test flights, proving that this extremely light weight diesel engine (no heavier than its counterpart in a gasoline engine) would fly on a fuel consumption of not to exceed 3 gallons per hour as compared with the fuel consumption of as much as 7 to 9 gallons per hour for a gasoline engine of comparable horsepower.

"We defied the traditions of the diesel engine industry when Mr. Fred A. Thafeld designed and built our first engine in California," said Mr. Leslie M. Barton, president of Diesel Power, Inc. "Many diesel engine designers scoffed at the idea of threading and shrinking cast aluminum cylinder heads to steel cylinder barrels. However, we took a rebuilt gasoline aircooled, aircraft engine and replaced the old cylinder heads with those of our own de-

signed combustion chamber and fuel injection, discarding the original magnetos, ignition wiring, spark plugs, carburetor and fuel supply pump. The compression ratio of these original gasoline engines was less than 7 to 1. In applying our diesel development to these engines, the compression ratio was increased to as much as 14 to 1 and in some instances 16 to 1 with no damaging consequences. To prove the soundness of our invention," Barton added, "Prof. Peter Kyropoulos of the California Institute of Technology was engaged to conduct a series of firing pressure tests. Evidence that we had achieved all that was believed and claimed is contained in a single paragraph of the certification of these tests which reads, 'It is seen that the compression end pressure is of the same order of magnitude as the firing pressure.' Reference is also made in this report to photographic reproductions of the screen of the oscilloscope which faithfully reproduced the pressure curves in both instances.

"Perhaps the best explanation of our development for the layman lies in the fact that, whereas the conventional diesel principle developed by Dr. Rudolf Diesel in Germany more than 50 years ago provides an extremely high peak firing pressure comparable to striking the head of the piston with a sledge-hammer, we accomplish a much lower initial firing pressure with a specially designed

combustion chamber and fuel injection which adds a series of further rapid power pulsations or 'explosions' to each single power stroke. This is why, as shown by the California Institute of Technology tests, a cylinder with its fuel supply cut off entirely is subject to the same magnitude of pressure as the same cylinder when the fuel supply is restored and that cylinder is functioning normally with its full power. This is why we do not blow off the cylinder heads, even with double the compression ratio of the same engine operating on gasoline and with spark ignition."

The new diesel engine, according to Barton, has a sea-level horsepower rating of 100 at 2400 revolutions per minute and 125 horsepower at 2600 revolutions per minute. The bore of the engine is 4 3/4 inches and the stroke 3 3/4 inches. The more rapid acceleration of the diesel engine is far more important to the flyer than it has long been to the commercial truck user of the conventional diesel engine. This is because it provides more instant maneuverability. Then, too, there is more power available from a gallon of diesel fuel than from a gallon of gasoline. Power is derived from the btu's in the fuel whether it be diesel fuel or gasoline. And a gallon of diesel fuel contains as much as 14,500 more btu's than a gallon of gasoline.

In flying, the diesel engine has the advantage over gasoline engines of gaining power (revolutions per minute of the propeller) as the plane climbs, instead of losing as is the case with the gasoline engine. The gasoline engine burns 15 parts of air to one part of gasoline, whereas the diesel engine uses 30 parts of air with each part of diesel fuel. It is believed this new diesel engine will add as much as 40% to the ceiling of the gasoline engine.

Tests will shortly be made to prove this point. These advantages are made possible because of the fact that on each firing of the cylinder a very meticulously measured amount of fuel is injected into the combustion chambers under 1,500 pounds pressure per square inch. There is no spinning of the engine, as in the instance of the gasoline engine, waiting for the suction stroke of the conventional four-cycle engine to suck air through the carburetor and eventually provide an ignitable air-fuel mixture for combustion. In this new diesel the cylinder's combustion chamber receives as much fuel and air at the end of the first compression stroke as it will on the 1,000th. Other diesel advantages include the elimination of the electric ignition system and its interference with radio, and the freezing of carburetors.

The general offices of Diesel Power, Inc. are located in the Bessemer Building, Pittsburgh, Pa., and plans are being made to establish production facilities for both aircraft and industrial engines in the Pittsburgh area. Edward M. Power, Jr. of Pittsburgh, is secretary-treasurer of the company.

Measured quantity of fuel being put into tank just prior to the test flight in the presence of invited officials.





# Switch to **AUTO-LITE** diesel equipment

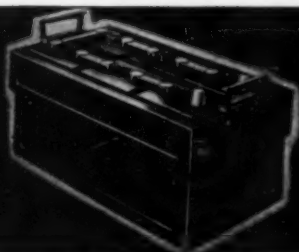
● The result of Auto-Lite's 41 years of automotive electrical experience, Auto-Lite Diesel systems are complete from generator to voltage control to battery to starter. The dependability of Auto-Lite electrical units in service has made Auto-Lite the world's largest independent manufacturer of automotive electrical equipment. Engineers and executives are invited to consult with us on Diesel cranking and generating equipment.

**THE ELECTRIC AUTO-LITE COMPANY**  
Sarnia, Ontario Toledo 1, Ohio

Money cannot buy better diesel equipment



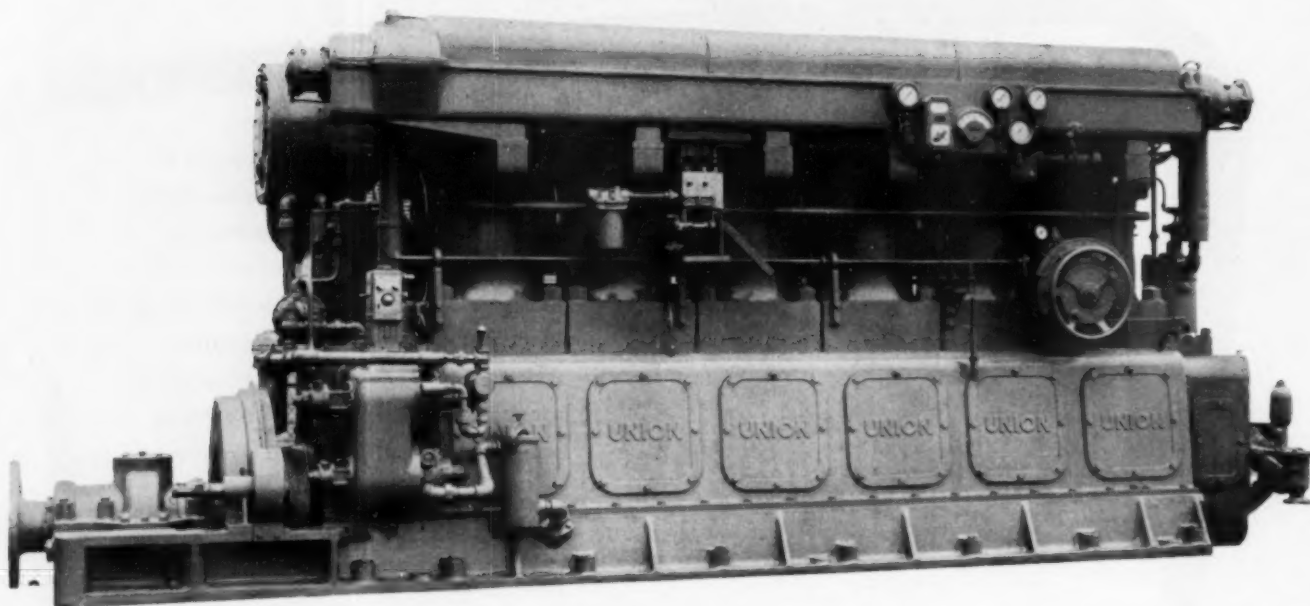
Tune in "Suspense"—CBS Radio Mondays  
CBS Television Tuesdays



**STARTERS  
BATTERIES  
GENERATORS**

# NEW UNION DIESEL P-6

By W. L. BODE



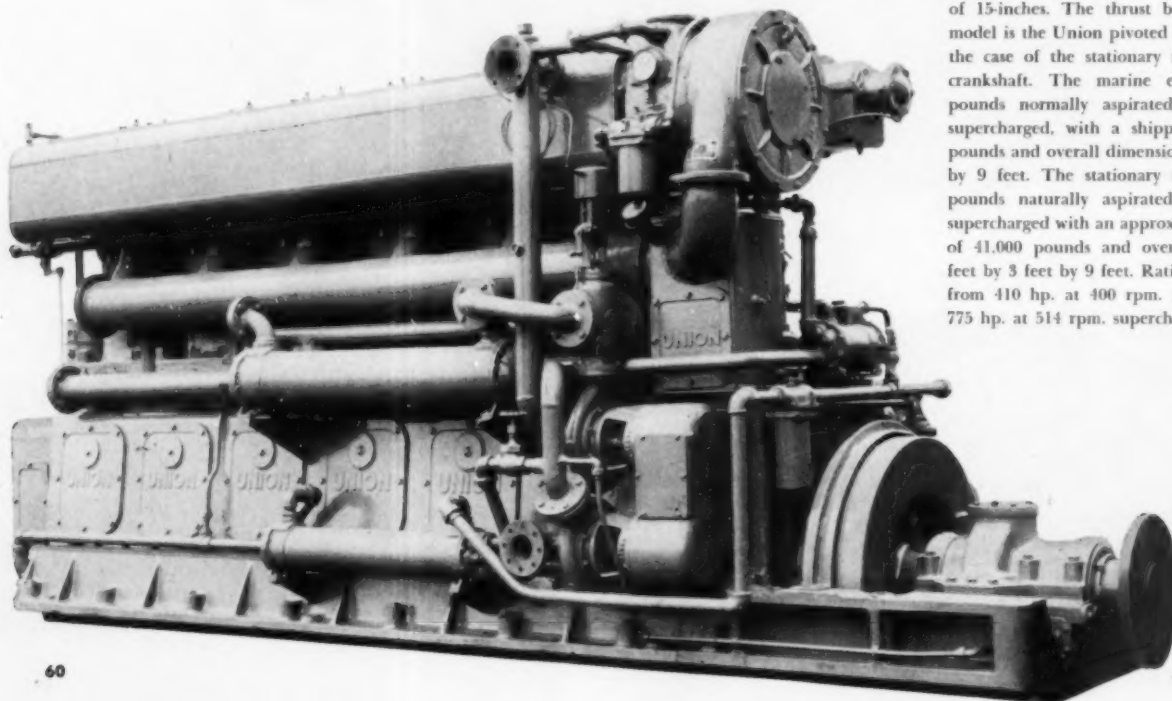
**T**WO years ago, a Model P6 Union Diesel engine was installed in the Canadian tug *Burnaby Straits*. The results of the two years of subsequent practical service proved so satisfactory that on the basis of the performance record, Union decided to offer the engine widely. Already, another Canadian concern, B. C. Packers, Ltd. has ordered a supercharged model rated at 750 hp. at 500 rpm. for a YMS conversion which they are making. Another supercharged model has been sold to Jackson Towing Company of Angleton, Texas, rated at 600 hp. at 400 rpm.

This Model P6 by Union Diesel incorporates designs and features developed and tested after the war. The press of the national effort effectively prevented any diversion of their staff for development working during the war years. But Union went to work on the new engine immediately afterward. Three years of designing, testing and building resulted in the Model P6, built in two types for both marine and stationary applications.

The Model P6 is a heavy duty engine of moderate weight and proven design resulting in maximum

reliability combined with economical operating and maintenance costs. Maximum accessibility has been attained with minimum overall space requirements. The six cylinders, individually cast, in line, are of the four cycle, single acting, naturally aspirated or supercharged, vertical, wet cylinder liner type. Features of the engine include oil cooled pistons, full-floating wrist-pins, four bolt connecting rod bearings and four-stud main bearing caps. Special design provisions make readily possible lubricating oil, fuel oil and jacket water arrangements as desired by any particular installation.

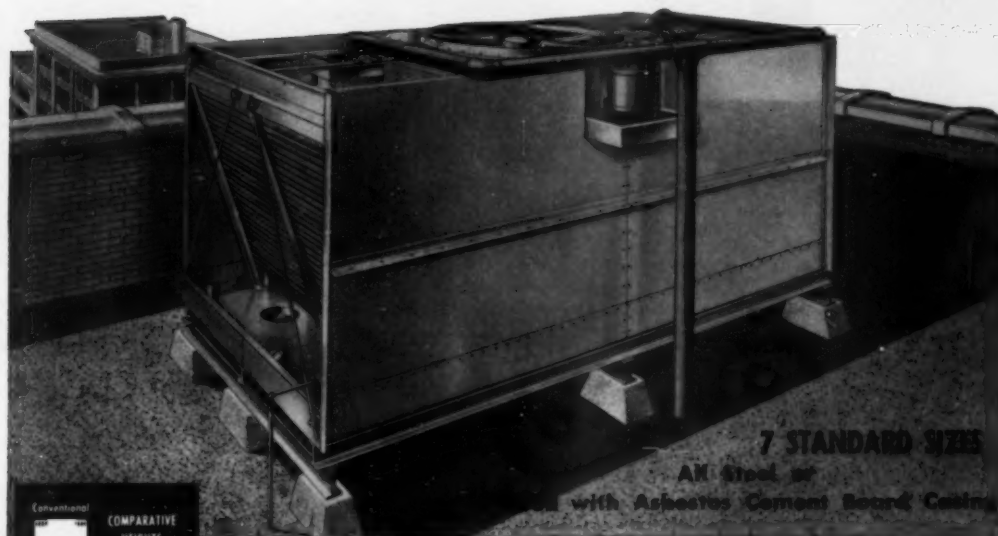
The cylinders have a bore of 12-inches and a stroke of 15-inches. The thrust bearing in the marine model is the Union pivoted segmental type and in the case of the stationary model, built into the crankshaft. The marine engine weighs 35,000 pounds normally aspirated and 36,500 pounds supercharged, with a shipping weight of 39,000 pounds and overall dimensions of 19 feet by 5 feet by 9 feet. The stationary model weighs 34,000 pounds normally aspirated and 36,000 pounds supercharged with an approximate shipping weight of 41,000 pounds and overall dimensions of 16 feet by 3 feet by 9 feet. Ratings of this engine are from 410 hp. at 400 rpm. normally aspirated to 775 hp. at 514 rpm. supercharged.



Two views of the new Union supercharged model "P6" diesel. Note Marquette governor, Cuno filters and Elliott supercharger.

# NEW DOUBLE-FLOW AQUATOWER

Marley Introduces Lowest Silhouette, Lowest Pumping Head Cooling Towers For Intermediate Capacities



## New Simplicity • New Accessibility • New Efficiency

By combining the outstanding features of the large patented Double-Flow and the smaller Aquatower (both accepted leaders in their fields), Marley has produced the cooling tower that will set the standard in another size range . . . THE DOUBLE-FLOW AQUATOWER. Architects, engineers and contractors will be equally enthusiastic about this tower because it is highly efficient, lowest in height and harmonious with building design, and remarkably easy to erect.

The Double-Flow design means low tower height and low pumping head; efficient air utilization—one fan drawing air from two completely open sides—with consequent minimum fan horsepower requirement. Open distribution, "at-a-glance" inspection are features, as are minimum load concentration and economical grillage and support.

From the Aquatower comes simplicity . . . of construction, of piping, of operation. The

nailess Redwood filling that is very easily installed or removed is another adaptation. All basin fixtures are readily at hand. Double-Flow Aquatower mechanical equipment is all designed, manufactured and guaranteed by Marley specifically for cooling tower usage . . . and it is all completely accessible.

You'll want complete details of this tower that will fit many installations in many industries, typical of which are those requiring 50 tons or more of refrigeration. Fill out the coupon below and you will receive it immediately.

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## WHAT'S GOING ON IN ENGLAND

CONDUCTED BY HAMISH FERGUSON

Hamish Ferguson was appointed Secretary to the Diesel Engine Users Association in London in 1944. Previously senior technical assistant to Diesel and Insurance Consultants, London, and for several years with English Electric Company in the designing and erection of large diesel generating plants. Mr. Ferguson continues to do independent consulting work.

### NEW DIESEL TRACTORS FOR AGRICULTURE

**A**S the result of the big price differential in fuels there is an increasing demand in the U.K. for diesel driven tractors for agricultural work. To meet this demand two new diesels have been developed and are now coming into production.

**FERGUSON TRACTOR.** The engine for the new diesel version of this well-known tractor has been designed and built by the Standard Motor Co. of Coventry. Compared with the petrol tractor in the field, fuel consumption shows, on volume basis, a saving of 30 to 40 per cent per belt hp. The weight of the tractor has been kept down to 23 cwt. 3 qrs. At 2,000 revs. the tractor develops approximately 25 belt hp.; at 1,500 revs., over 20 belt hp.; at 1,000 revs., approximately 15 belt hp. Through the use of the Freeman-Sanders patented combustion chamber and indirect low pressure injection of fuel, notably quiet and smooth running is claimed. A pneumatic type governor is used for the fuel injection pump. Special twin filters for fuel are fitted to ensure long life for pump elements and injectors. An auxiliary fuel tank is fitted to prevent aeration of fuel.

The stiff cylinder block with renewable dry liners

houses a fully static and dynamically balanced crankshaft which is generously proportioned and is barrel mounted. Overhead valves are operated by push rods and rockers from the camshaft in the cylinder block. Electrical equipment comprises two six-volt batteries mounted on extensions from the rear axle housing. The pre-engaged starter motor is operated from the sixth position of the gear lever and a special interlocking device ensures that the starter cannot be accidentally engaged while the tractor is running. The decompressor is hand operated from either end of the tractor. For cold weather starting the Kigass heater system is used. This consists of a small special fuel tank with hand-operated pump on the dash board and an atomizing nozzle in the manifold for spraying the fuel on to an electrically-heated glow plug.

Running tests have shown very low maintenance. Not before 1,000 hours is a top overhaul needed. Air cleaner changes and oil changes are recommended at the same periods as in the petrol tractor. One third of the wire wool element of the large capacity air cleaner can be removed to facilitate cleansing. The engine is claimed to be the lightest diesel on the market in relation to its output, and a further feature of note is that by the

adoption of the special combustion chamber low cetane number fuels can be utilized.

The engine has a bore of  $3\frac{1}{8}$  inches and a stroke of 4 inches, with a compression ratio of 17:1. Lubrication is through a Hobourn Eaton high capacity pump with a gauze filter over the suction pipe and cleaning is by a Purolator Micronic replaceable cartridge type filter. The cooling system is thermostatically controlled. The fuel pump and injectors are C.A.V., the pump incorporating a pneumatic governor. The valves are of the overhead type, operated by push rods and rockers. Timing is such that the inlet opens 5° before tdc. and closes 25° after bdc. The exhaust opens 45° before bdc. and closes 5° after tdc. There is an overlap of 10°. Valve tip clearance is .012 inches cold.

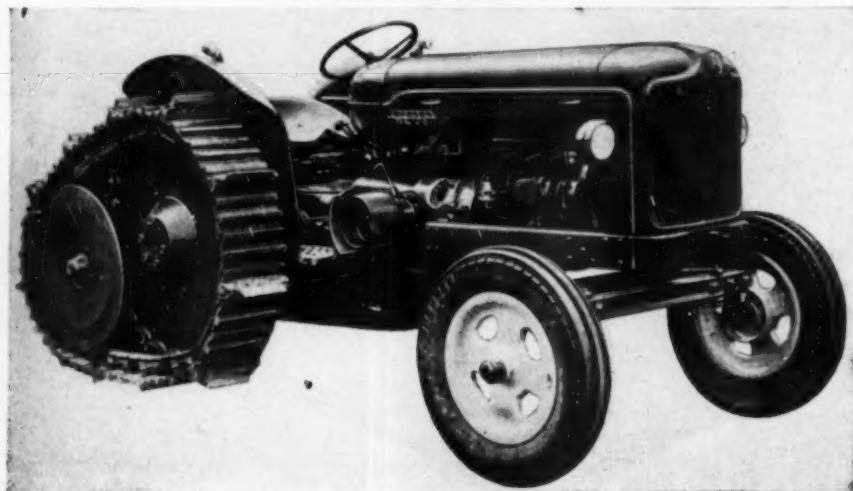
The pistons are of aluminum alloy, the connecting rods are 60 ton steel and the crankshaft features integral balance weights being fully static and dynamically balanced. The bearings are precision built of lead bronze, lead indium plated. Cams are of the harmonic type and the drive is chain.

**FORDSON MAJOR.** The Fordson tractor is supplied with three alternative engines to run on either petrol, vaporizing oil, or diesel fuel. Specification of the diesel is as follows:

It is a 4-cylinder, in line, overhead valve type, with a bore of 3.937 inches and a stroke of 4.528 inches. Displacement is 220 cubic inches. The compression ratio is 16:1. The pistons are of aluminum and the crankshaft is located in five shell type bearings. Both the cylinder block and the liners are cast iron, the block being of the wet liner type. The head is also of cast iron and detachable. Vertical overhead type valves are operated by push rods from the gear-driven camshaft with the diameter of the inlet valve heads larger than the exhaust.

The lubricating system is a pressure feed type by means of a submerged gear type pump. The full flow oil filter is fitted directly to the block. A thermo-syphon, impeller assisted cooling system has the thermostatic control fitted in the cylinder head water outlet, and the 2 bladed fan is driven by a single V belt. Calibration of the injection pump is at 600 rpm. The plunger stroke and diameter is 7 mm. by 7 mm.

Fordson diesel tractor.





# this Worthington diesel...

(shown during erection)

for the first  
diesel driven  
hot oil pump  
in the world

*Ross exchanger  
equipped!*



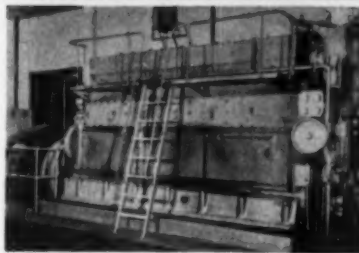
On this 450 hp Worthington diesel driving a sextuplex hot oil pump — the first of its kind in the world — a Ross lubricating oil cooler has been installed as a factory component.

Likewise, on numerous other Worthington diesels (two are shown), Ross Exchangers are being given the lube oil cooling assignment.

The wide use of Ross Exchangers in the diesel industry today is not anything that happened over night. It is a trend that began many years ago. And then, as now, just a few simple reasons have made the big difference:

The Ross reputation for proved dependability; complete standardization of design, of sizes, of component parts that so greatly simplify engineering; diversification of standard types to cover most conditions; prompt service from the factory on engineering problems and deliveries.

These reasons are important to you too, in the solution of your heat transfer problems. Give us an opportunity to apply them to your needs.



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# SERVICING ZERO-LASH HYDRAULIC VALVE LIFTERS

This is Part II, the conclusion, of this article. Part I appeared in the January issue of DIESEL PROGRESS.

When disassembling the Stub Type Unit be sure to hold the lifter over a pan of clean solvent. Otherwise the ball and retainer may fall out and be lost. Hold the lifter with the inlet holes down. If the plunger cannot be removed with the fingers then it may be removed from the cylinder by inserting the prongs of a bent wire in the two inlet holes. A light pull will remove the plunger. If, in spite of your care, the ball or the retainer is lost, replacement can be made by the use of new approved parts or by parts which have passed rigid inspection for damage. Arrange the parts so that there will be no chance of the parts of one unit being mixed with the parts of another.

**NOTE:** Sometimes it may be found that the plunger cannot be removed easily from the cylinder. If you encounter this condition, it will be caused by one of two things: 1. In very rare cases, the plunger will be stuck in the cylinder. If the plunger SEEMS stuck, do not discard the unit, because: 2. In most cases, the condition is due to a deposit of carbon which has formed at the shoulder of the cylinder, above the plunger. If the oil chamber is still filled with oil, sealed in by the ball check valve, the plunger will be held rigidly against the carbon ring, and with the oil trapped under the plunger will give the IMPRESSION that it is "stuck." To determine whether or not the plunger is stuck, insert wooden stick in the oil inlet at the bottom of the cylinder. This will unseat the ball check-valve, and allow the oil to drain out. This instruction does not apply to the Stub Type Valve Lifter.

You should now be able to press the plunger down, which indicates that the plunger is not stuck, but is held in the cylinder by the carbon deposit. If the plunger cannot be removed because of the carbon deposit, soak the unit in solvent and use taped pliers, if necessary. A combination twisting and pulling motion will separate the plunger from the cylinder. The plunger and the cylinder are selectively fitted at the factory, and the plunger from one cylinder cannot be used in other cylinders. In servicing a lifter, if you find it necessary to discard

a faulty plunger or cylinder, its mate must also be discarded, regardless of its condition.

With the lifter parts separated, next give them a thorough cleaning. Even though they received a preliminary cleaning when first removed, they should now be cleaned separately, so that no possible trace of foreign matter remains. Immerse the parts in clean, approved solvent and wash thoroughly. This procedure should remove all dirt.

**Checking The Leak-Down Rate.** By leak-down rate is meant the rate at which oil escapes between the cylinder and plunger of the hydraulic unit. This rate is carefully determined at the factory. However, the leak-down may increase due to wear and, therefore, should be checked. There are fixtures available for checking the leak-down rate. If these are used, the instructions which accompany them should be followed exactly. However, you can check the unit without equipment to determine whether or not it will operate properly. To do this, proceed as follows: Make sure there is no lubricating oil on the cylinder wall or plunger. Always check immediately after washing in solvent. With the cylinder held upright in one hand, start the plunger into the cylinder with the other. Depress the plunger with the finger and release quickly.

With the Stub Type lifter hold the plunger with the inlet holes down. Insert the ball. Insert the retainer. The cylinder is now placed over the plunger. Leak-down is tested by pressing down on the cylinder.

Remember that the plunger is now operating against air instead of oil. This air is sealed in by the ball check-valve, and by the close fit of the plunger to the cylinder. It should yield slightly to the pressure of the finger on the plunger, but the plunger should kick back upon release of the pressure. If no kick back occurs, the unit may or may not be defective. It is due to one of three conditions: 1. Air is escaping past the check-valve because of the presence of dirt which prevents the ball from seating properly; 2. Air is escaping past the check-valve because of damage to the ball seat; 3. Air is escaping because the clearance between the plunger and cylinder wall is too great, indicating excessive leak-down rate.

First, determine whether the condition is due to a leaking check-valve. To do this, place a finger over the oil inlet. Now, press the plunger down again and release quickly. If it kicks back properly, the fault lies with the check-valve.

In checking the Stub Type Unit, both inlet holes must be covered by the fingers while the cylinder is being depressed.

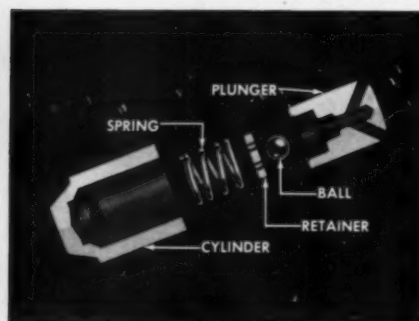
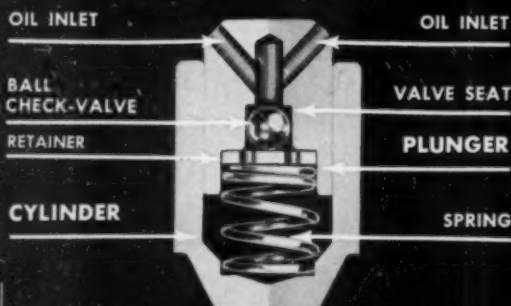
If the unit kicks back properly when the inlet holes are covered, rewash the unit to eliminate the possibility that any dirt might be fouling the check-valve. Repeat the test without holding the finger over the inlet hole. If there is still no kick back, then the check-valve is damaged and the entire unit (cylinder and plunger) should be discarded. If there is no kick back even when the finger is held over the oil inlet hole, it is an indication that too much leakage is occurring between the plunger and cylinder wall. In this case, the entire unit should be discarded.

**NOTE:** In the above testing procedure, it is important that pressure be released immediately after depressing. If the plunger is held down too long all the air trapped under the plunger will leak out and the test would not mean anything.

In addition to an improper leak-down rate, or damaged ball check-valve, there may be other conditions which would make it necessary to discard a part. Therefore, additional inspection is necessary. Inspect the plunger and cylinder for any unusual worn places, cracks, and so on. Discard both parts of the unit if any damage is found. The parts of the hydraulic unit have now been found to be okay, or have been replaced by parts in good condition.

**Inspection of Tappet Bodies.** **NOTE:** (These instructions do not apply to Stub Type.) Examine the face of the lifter body. Clean the face of the lifter with solvent and wipe dry with a clean cloth. Check the face for: 1. Scoring; 2. Wear; 3. Pitting (or Spalling). If the face of the lifter shows small nicks near the center of the face, it is pitted (or spalled). The area covered by the spalling will vary with different lifters but regardless of the degree, the lifter must be discarded and replaced

The stub type valve lifter for overhead valve engines. The drawing below right shows where a deposit of carbon can cause the plunger to stick.



by one in good condition. A lifter face is scored when small, scratch-like lines are formed on the surface. They are usually found near the outer edge of the face and appear to radiate from the center. Other scoring marks may be present and extend to the center. If the lifter face is in this condition, it must be discarded and replaced by one in good condition.

The wear that takes place on a lifter face that does not rotate will show up as a path that has been formed by the wiping action of the cam. In addition to the path that extends all the way across the face, there will be extra wear at the center. If the wear is excessive, it will be noticeable to the touch if a finger-nail is rubbed across the lifter face. If this condition is present the lifter body must be discarded. If the worn path is visible but not noticeable to the touch, it should still be discarded unless by so doing a badly needed engine would be kept out of service.

**Assembling the Hydraulic Unit.** 1. Insert the plunger in the cylinder. Both parts must be free of lubricating oil if the lifter is to be reinstalled in the engine immediately. If the unit is not to be reinstalled immediately, the parts should be given a light film of oil to prevent rusting. 2. Push down on the plunger so that the spring can be engaged with the counter-bore of the cylinder. This is done by twisting the spring and plunger in the direction that "winds up" the spring. Insert the assembled hydraulic unit in the lifter body.

**Assembling the Stub Type Lifter.** Hold the plunger in the fingers of one hand with the inlet holes down. Replace the ball. Replace the retainer. Insert the spring, and snap it into the plunger counter bore. Place the cylinder over the plunger and press the parts together until the spring snaps into place in the cylinder.

**Reinstallation in the Engine.** You will remember that the removal of the lifter from the engine depends upon the design of the engine. The same thing is true of reinstallation. The easiest and best method has been determined by the engine builder, and the manufacturer's handbook that accompanies the engine should be consulted.

**Checking Pre-Starting Clearance.** The clearance that is to be provided in the valve train is not for the purpose of compensating for heat expansion. The hydraulic unit takes care of that. The clearance referred to here is necessary because the hydraulic unit has been reinstalled minus the oil column. This leaves a clearance in the unit that will be taken up automatically when the engine is started. The place where this clearance is to be measured depends upon the engine design. In some cases, it is measured between the rocker arm and the valve stem. Consult the engine builder's handbook for specific clearances.

**Caution.** Remember that at all times during servicing operation the hydraulic valve lifter should be considered as a delicate precision instrument. In handling the lifter or the lifter parts, it is important that you exercise the utmost care, so as to prevent even the slightest damage. The results will warrant the extra care you take.



## Here's low cost *Life Insurance* for diesel engines



### NUGENT FILTERS for fuel and lube oil

The amount of protection afforded by fuel and lube oil filters is dependent upon the effectiveness of the filters... and all filters are not equally effective. You'll see what we mean if you'll compare Nugent Filters with any others. By actual test, Nugent Absorbent Oil Filters remove 99.8% of the dirt. Dirt and carbon particles as small as a few microns are removed and prevented from getting to those areas where they can accelerate wear and shorten engine life.

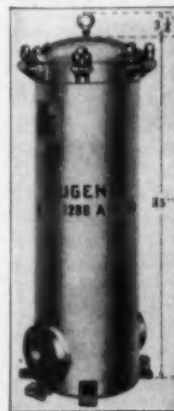
Size for size, Nugent Filters offer greater filtering area. In addition, they make possible a choice of full flow or by-pass filtering with the same unit. Recharges are inexpensive and easy to install. Simple piping makes installation no problem.

Write for descriptive literature that shows how to insure the long life of your diesel.

Three 720 H. P. Cooper — Bessemer Diesel powering the American Barge Line Company's new "Mount Vernon", illustrated above, are equipped with Nugent Filters for fuel and lube oil, helping to assure the owners that they will get all the fine service these engines are designed to give.



Above — One of the Nugent Duplex Fuel Oil Filters installed on the "Mount Vernon." Below — A Nugent Lubricating Oil Filter of the type used on the "Mount Vernon."



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# BENSON, MINNESOTA

By T. J. MALONE

**D**ESPITE costs of materials, labor, everything, 1950-1951's net profit of the Municipal Water and Light Plant in Benson, Minnesota, population 3388, was the highest in its forty-three years of operation. The net, \$40,809, was 69.5 per cent more than the net of the year before, which was \$24,067. This didn't just happen. It was planned for, worked toward, through that year and before. There was a reason for it, four reasons in fact. The electric plant, diesel-steam, is, of course, the profit maker of the combination. It contributed to that \$40,809 total all but \$131 proudly scored by the water department. The steam member of the partnership, which gives a heating service with electricity as a by-product, ran \$431 behind in receipts, an amount deducted in arriving at the net figure.

What were the four reasons for the record profit? — Basic was the electric plant's increase of half a million kilowatt hours in production in that year ended March 31, 1951. "As volume goes up, production cost goes down." The plant made electricity more cheaply. A change from use of a gas fuel oil to crude, in the summer of 1950, accounted to no small extent for the profit margin. The change resulted in a saving of about 1.5 cents a gallon, with everybody satisfied. High scoring by the newest diesel engine was an important factor. This engine is a six-cylinder, 1320 hp. 925 kw. supercharged 4-cycle Worthington. It ran 5036 hours in 1950-51, which was 30% more hours than in the year before, and generated 3,293,600 kwh. of energy, or 38.5 per cent more than in the year before. This production was 58.2% of the plant's 1950-51 total of 5,651,490 kwh. The year before, this engine had produced 46.3% of the plant's total. The Worthington was taking over, throwing its weight. Through the year 1950-51 this engine maintained an average output of 13.78 kwh. to a gallon of fuel oil, against a 12.77 kwh. average for all three diesels. In three of the twelve months, the Worthington produced at an average monthly rate of 14, 14.10 and 14.15 kwh. In seven others of the twelve months the monthly averages ran from 13.32 low to 13.93 high. The lowest average of the year was 13.3. In January, 1949, it turned out a 14.57 average.

Still another reason for that high net profit, as important perhaps as any other, was the increased efficiency of plant operation resulting from the greater flexibility of engine use made possible by the Worthington engine. Benson's first electrical service came from a privately owned gasoline-powered plant. The owner put in a steam engine and later sold the plant to the city. In 1928-29, two steam engines, each 400 hp. 260 kw., bought at second-hand, replaced the old equipment.

They have been running ever since. Heating service is supplied to public buildings, several blocks of commercial buildings and a few residences. Electrical production is incidental to that service. The steam units operate only through the colder months and in summer energy production is by diesel.

The plant's diesel era began with the installation of a 5-cylinder, 500 hp. Fairbanks-Morse unit in 1936. Three years later another F-M was put in, an 800 hp., also of 5 cylinders. The third diesel, the Worthington, model SEH-6 went into operation in September, 1948. The three-diesel rated capacity is 1874 kw. of pattern: 343-606-925. Steam's seasonal output raises the plant capacity to 2394 kw. Before March, 1948, the plant's operation year was from March 1 to February 28. The first full operation year of one-diesel operation was 1937-38. Total production, diesel and steam, that year was 1,570,250 kwh. The diesel's share was 859,400 kwh., at an average of 11.09 kwh. per gallon of fuel oil. The first full year of two-diesel operation was 1940-41. In that year, total output, diesel-steam, was 2,728,940 kwh. Two-diesel production was 2,014,850 kwh., at an average of 11.62 kwh. per gallon.

In 1948, the year of the Worthington's purchase, the plant's operation year was changed to begin April 1 and end March 31. That made 1948-49 a 13-month year for bookkeeping purposes. The following performance table embraces the full Worthington period from installation to March 31, 1951. In the table, D stands for diesel, S for steam, T for total. In "Average kwh. generation cost" and in "Average cost delivered per kwh. generated", the figure above the line for each year is computed before depreciation and the figure below the line is computed after depreciation.

In 1948-49, the Worthington unit produced 574,300 kwh (six months) at an average of 12.75 kwh. per gallon of fuel oil; for the next year, its production was 2,378,000 kwh. and the output per gallon averaged 13.51 kwh. Deducting one-thirteen from the 1948-49 generation volume leaves 5,352,194 kwh as an estimate for 12-month production. Depreciation of \$22,828 was included in the electric plant's operating expenses of \$112,252 in 1950-51.

Average revenue per kwh. is based on net energy sales. Net profit of electric-water-steam plant, 1948-49, \$23,186. The table gives the diesel-steam plant's rated capacity as 2394 kw. By a neighborly relation with an REA generating station just outside Benson (each plant is tied in with the other) the municipal plant is certain of service up to 500 kwh. from the REA plant. This assures the Municipal plant a total overall potential of 2894 kw. The peaks of the two plants do not coincide and this makes for economical interchange in case of need. It will be noted that generation costs in 1950-51 were considerably lower than those of the years before, resulting in corresponding reduction in delivered costs. Besides the mounting use of the Worthington unit and its high economy, the unit costs reflect savings in fuel-oil cost through the change to crude oil. Carl D. Alsaker, superintendent of the Municipal plant since 1934 and an operator there for twenty years before, tells about that use of crude: "We started to use crude oil in the summer of 1950 and gradually worked up to crude only. We began by combining crude with the oil

we had in storage until we were running on crude entirely. All engines were supplied from the same tanks. Currently, this June of 1951, we are paying 10.59 cents for crude here, on track, as compared with 11.5 cents for the former oil. We find crude quite satisfactory. We run it through a Honan-Crane filter for the Worthington and the Nugent filters on the Fairbanks-Morse two take care of it for them". The crude is running 22.24 gravity as compared with 28.32 for the gas oil used before.

Records of production and running hours of the three diesel units for the two full operation years in which the Worthington has operated indicate how the Worthington has taken more and more of the load and is being run longer and at somewhat higher loads. See Table II.

Domestic consumption accounted for the largest use of electricity in the 1950-51 year, a total of 1,743,767 kwh. Commercial lighting was close behind with 1,267,926 kwh. Water heating came third with 1,141,661 kwh. Commercial power totaled up 567,942 kwh. much of it going to these industries: three grain elevators, two feed mills, two creameries, two hatcheries, two machine shops. There were 1838 meters in use and 434 water heaters. To what extent may consumer rates account for 1950-51's record breaking net-profit increase? As the most recent rate increases became effective on October 1, 1948, they applied all through the Worthington period — through 1949-50 and the last six months of 1948-49. So they can't have been a factor in the net-profit record. The top rate for residence lighting is 6½ cents for a first 30 kwh., dropping to 2 cents minimum after use of 180 kwh. The beginning rate for commercial lighting is also 6½¢, decreasing to a 2½¢ minimum after 1500 kwh. of use. Commercial power begins at 5¢ for 200 kwh. and drops to 2¢ after 5000 kwh. of use. The water heating rate is 1½¢ per kwh. All rates are net, subject to 10% penalty for slow payment.

The building housing the municipal power plant faces the railroad station across the street. It contains three diesel generating units, including the 1320-hp. supercharged Worthington engine, and two venerable steam engines.





Overall valuation of the electric plant on March 31, 1951, was \$617,548, without depreciation. This covered land, building, machinery and other equipment, and distribution system. At the close of the steam-only period, the book value of plant property was \$136,624, there was a debt of \$50,000 and \$30,000 cash on hand. In the diesel period, revenue bonds, against plant earnings, have been issued totaling \$288,980. On March 31, 1951, earnings had paid \$148,980 for debt retirement, leaving \$140,000 outstanding debt. There was \$36,500 cash on hand.

For purposes other than debt retirement, a total of \$371,882 had been paid from earnings, \$198,860 of it as outright "contributions" to the city's general fund. The rest had gone for plant additions, water mains, street lighting, improvements to the electric distribution system, and the like. A commission of three members directs the water and light plant. They are L. E. Goggin, Knute Odden and Ambrose L. Quinn.

What of the current year? Of the \$16,741 record increase in overall net profit in 1950-51, from \$4,000 to \$5,000 is attributed to the economy of the Worthington engine. Can the electric plant in 1951-52 equal its record of the year before as to increase in its own net profit? Can it exceed that? For the first quarter of the 1951-52 year, April-May-June, production of the five-unit plant was 1,408,040 kwh. Of that volume, 1,341,440 kwh. was diesel-made; 850,900 kwh. was Worthington-made. The three-diesel average out-put per gallon of fuel oil was 12.66 kwh and that of the Worthington alone was 13.34 kwh. In volume the plant was running even with the year before and it would use crude the full year as against half that period the year before. The Worthington had operated at up to 85, and even 90% load factor at times, without grumbling; and its 1950-51 average of 13.8 running hours a day was not necessarily a maximum.

The 6-cylinder, 925 kw. supercharged Worthington diesel engine produced 3,293,600 kwh. of energy in the operation year ended March 31, 1951, at an average of 13.78 kwh. per gallon of fuel oil, run at 70.7 load factor. Elliott generator in background.

TABLE I

Operation Year	Gross Vol. KWH Gen.	KWH per Gal. Fuel	Av. Gen. Cost per KWH, Cts.	Av. Cost Delv. per KWH Gen., Cts.	Av. Rev. per KWH Gen., Cts.	Peak Load, KW	Rated KW Capacity
1948-49	D-4,820,870	11.40	f 1.42 1.56				
	S- 977,340		f 2.42 2.56				
	T-5,798,210		f 1.59 1.73	1.83 2.06	2.50	1200	2394
1949-50	D-4,578,220	12.23	f 1.23 1.60				
	S- 757,000		f 2.58 2.95				
	T-5,135,220		f 1.42 1.79	1.71 2.16	2.73	1200	2394
1950-51	D-4,836,990	12.77	f 1.16 1.48				
	S- 814,500		f 2.20 2.52				
	T-5,651,490		f 1.31 1.63	1.59 1.99	2.75	1300	2394

### List of Equipment

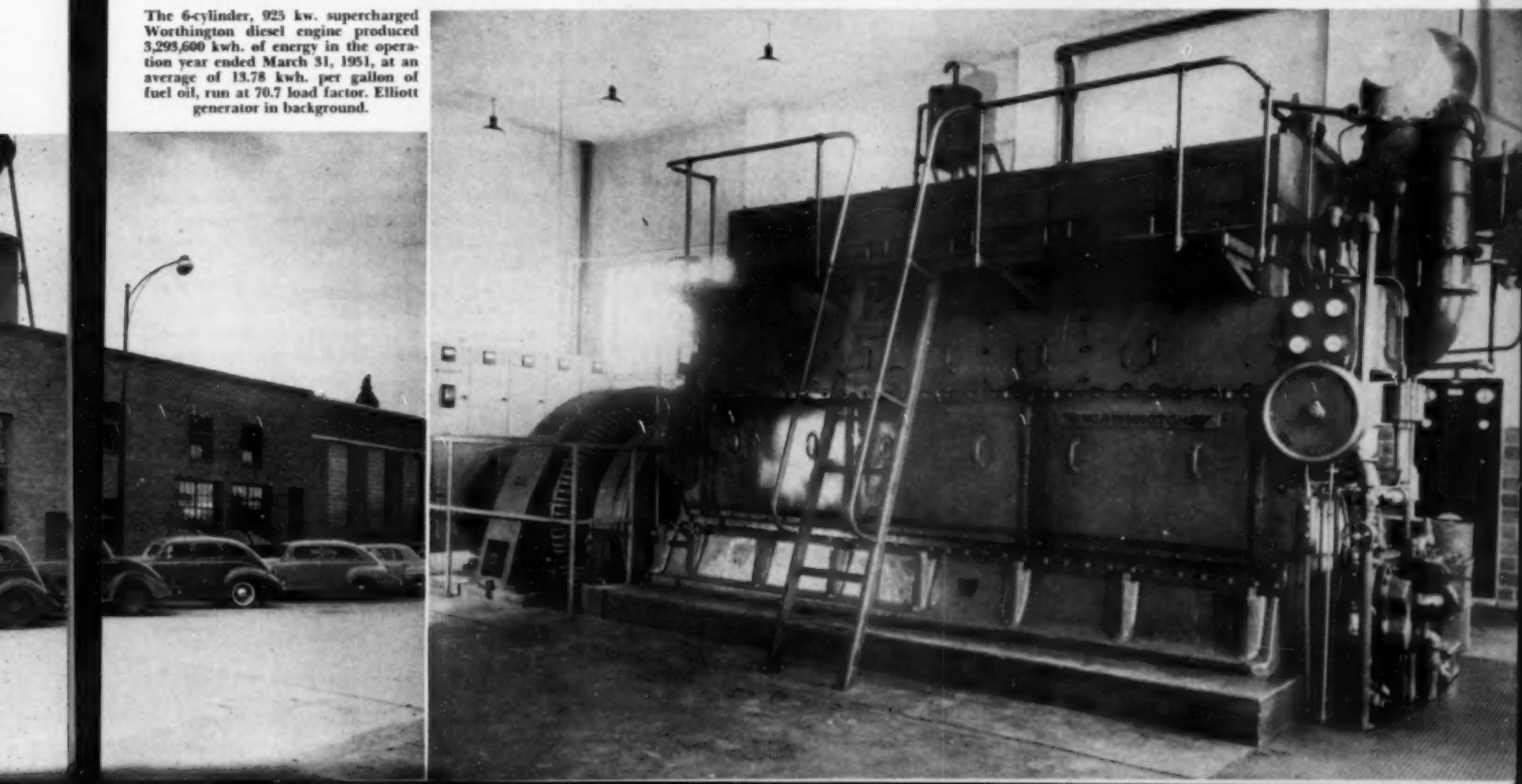
Engines—1936—500 hp. Model 33-D-12 Fairbanks-Morse; 1939—875 hp. Model 33-D-16 Fairbanks-Morse; 1948—1320 hp. Model SEH-6 Worthington.

Generators and exciters—Allis Chalmers on the first Fairbanks-Morse; Fairbanks-Morse on the second Fairbanks-Morse; Elliott on the Worthington.

Turbocharger—One, Elliott-Buchi.  
Governors—Woodward Governor Co. (3)  
Air Filters—Two American and one Air-Max  
Fuel Oil Filters—one Honan Crane for the Worthington; Nugents on all the Fairbanks-Morse  
Heat Exchangers—Ross for the Worthington; Schutte-Koerting for the Fairbanks-Morse units.  
Silencers—Maxim  
Pyrometer—Alnor  
Lube Oil Purifiers—Honan Crane for the Worthington; Hilco for the Fairbanks-Morse units.

TABLE II

Engine Unit	KWH Volume		Hours Run		Load Factor, %	
	1949-50	1950-51	1949-50	1950-51	1949-50	1950-51
Steam #1 (260-KW) .....	363,000	108,500	2483	663	56.19	62.92
Steam #2 (260-KW) .....	394,000	706,000	1849	4311	81.92	62.96
F-M (343-KW) .....	358,406	176,900	2058	1060	50.75	48.62
F-M (606-KW) .....	1,641,820	1,366,490	4173	3601	64.91	62.60
Worth. (925-KW) .....	2,378,000	3,293,600	3866	5036	66.49	70.70



## Predicts Increased Demand

Based on a careful projection of current trends, industrial instrument demand by 1955 should double purchases of 1950. At least 56 per cent of the increase will have been realized in 1951, 78 per cent of the total by the end of 1952, and the remainder of the increase will be distributed through 1953 and 1954. The foregoing estimates were reported by Henry F. Dever, president of Brown Instruments Division of Minneapolis-Honeywell Regulator Company. Mr. Dever pointed out, however, that future actual increases will be greatly determined by the aggressiveness of the industry's activity in expanding to meet these demands. Present physical and machine capacities are being

taxed to meet an accelerated business resulting from defense and modernization programs and technological advances, Dever said. Further demands are being experienced from mounting research and laboratory work, he added.

"In addition to basing our estimates on incoming orders," Dever said, "we have measured them by a yardstick that indicates greater use of industrial instruments by firms whose growing needs for instrument controls are only now being realized. A clearer picture of what is happening and what may be expected is reflected by industrial instrument business during the past 20 years. It is estimated that in 1930, 14,000 manufacturers were serviced by process measuring and controlling instrument

makers. By 1940 industrial instrument users rose to 18,000. Today orders stem from not less than 40,000 buyers."

## Purolator Appointment

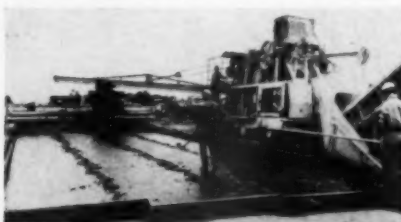


Donald C. Huber

Appointment of Donald C. Huber as assistant advertising manager of Purolator Products, Inc., oil filter manufacturer, Rahway, N.J., has been announced by Carlos D. Kelly, vice-president in charge of sales. Formerly director of merchandising and sales promotion for Arthur Cohn & Associates, New York, Mr.

Huber is a resident of East Orange, N.J., where he received his early education at the East Orange High School. He later attended Louisiana State University, Drexel Institute of Technology, and Seton Hall University, South Orange, N.J. A veteran of World War II, Mr. Huber served overseas with the 11th Armored Division in the E.T.O. In his new position at Purolator Products, Inc., he will act as assistant to Karl H. Mayers, advertising manager. Mr. Huber's appointment is another step in Purolator's intensified sales and promotional program on its fuel, lubricating oil and other types of filters for automobiles, aircraft, farm implements, and industrial uses.

## Canadian Road Builder



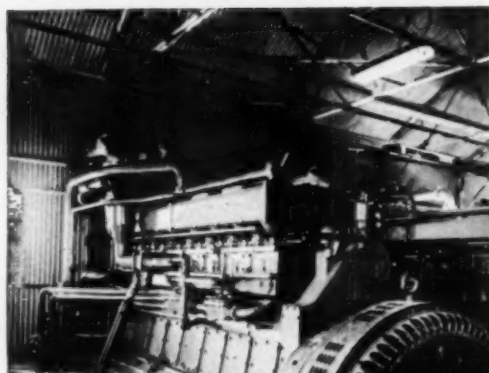
H. J. McFarland Construction Company, Limited, Picton, Ontario, utilizes this Model 34 E Dual Drum Ransome Paver, powered by a 150 hp. Model HBI-600 Cummins diesel, on many of the Canadian Province's major highway projects. The photograph above was taken on the new Toronto-Barrie highway, just northwest of Toronto. H. E. Harris, a McFarland superintendent, reports that this Cummins-powered paver lays an average of 100 yards of concrete per hour.

## New 2 Kw. Generating Set

Sheppard Diesels, Hanover, Pennsylvania, announces the addition of a new 2 kw., light weight, generating set to their already extensive line of full diesel engines and farm tractors. Tests which the company has been conducting for the past year, are now completed and the new generating set is now ready for distribution. The new 2 kw. light weight, generating set has capacity of 2,000 watts, at 1800 rpm. This unit is also available in ac. as well as dc. and in all standard voltages. This unit is designed to replace as much as 1,000 lbs. of batteries on marine installations. The entire unit weighs 395 lbs. and is powered by a single cylinder, Sheppard diesel engine.

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## Seattle Office



Carl S. Harris

Establishment of a Nordberg branch office in Seattle, Washington, effective last month has been announced by R. W. Bayerlein, vice-president, Heavy Machinery Division, Nordberg Manufacturing Company, Milwaukee, Wisconsin. In establishing this office, Nordberg acquired the entire sales and service facilities of the former Al-Pac Engine & Equipment Company. Mr. Carl S. Harris, well-known in his former association with Nordberg and Al-Pac, has been appointed manager of this new west coast operation. Located at 2520 Westlake Avenue, North, the new Seattle office offers expanded sales and service facilities for the complete line of Nordberg diesel and gasoline marine engines in the Pacific Northwest area including Alaska. Mr. Harris, manager of the Seattle branch office, attended Oregon State College where he majored in mechanical engineering. In 1933 he was employed as a diesel engineer aboard a west coast tug boat and continued in this service until 1936 when he joined Fairbanks Morse & Co. He enlisted in the U. S. Navy as an Ensign in 1940 and was subsequently promoted to Lieutenant j.g. and the rank of full Lieutenant. Following his discharge from the Navy in 1946, he was employed as a ship repair estimator for Pacific Electric & Mechanical Company. In 1949 he was named manager of Al-Pac Engine and Equipment Company; which, prior to January 1952 was a distributor for Nordberg Manufacturing Company in the same territory which is now to be covered by the Nordberg Seattle branch.

## Two Appointments

Appointment of Robert J. Minshall as president and general manager and of G. V. Patrick as vice president and assistant general manager of the Marvel-Schebler Products Division of Borg-Warner Corp. has been announced. Mr. Minshall also is president of the Pesco Products Division of Borg-Warner at Bedford, Ohio, and the Wooster Division at Wooster, Ohio. Mr. Patrick, who joined Borg-Warner in 1948 as eastern sales manager for Pesco, was transferred to Decatur in September, 1950, as assistant general manager of the newly established Marvel-Schebler Products plant. The reorganization of the Marvel-Schebler executive staff was occasioned by the retirement from the presidency of S. W. Gray, widely known in the automotive and farm equipment industries since the turn of the century. Mr. Gray entered the industrial picture in 1908 in the employ of the Haynes Automobile Co. During World War I—his only absence from the manufacturing field—Mr. Gray was a captain in the U.S.A.F. and served in France as officer-in-charge of aircraft maintenance. In 1923 Mr. Gray joined the Wheeler-Schebler Carburetor Co. at Indianapolis, Ind., as a project engineer. He was serving as assistant chief engineer when the Wheeler-Schebler Co. was merged with the Marvel Carburetor Co. of Flint, Mich., in 1928 and the combined companies became the Marvel-Schebler Division of Borg-Warner.



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- Unit 9B16-213, for 15 months of day and night outdoor service, was operated beyond its rated capacity to meet unforeseen demands. It was replaced by a larger Standardaire Blower. The engineer of this plant asked that the hard working unit be sealed and returned to our factory so that he personally could observe the dis-assembly and measurements for wear.
- Main and Gate Rotors like new—interior of blower completely dry and free of oil—no wear in other internal parts.
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- Axial clearance of Main Rotor Shaft Thrust-Radial Bearing, increased less than .0005"—other bearings in perfect order.
- Even at the extremely high peripheral speed of these gears, they were found to be very quiet in service.
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Case History  
**STANDARDAIRE BLOWER**  
9B16-213  
User—Large Chemical Plant  
Service—Continuous Outdoors  
Operating Pressure—12 psig  
Revolutions—(Approx.)  
1,500,000,000  
Vol. of Air Handled—  
(Cu. Ft.)—1,300,000,000





## FROM HORSES TO DIESELS

By W. L. BODE

**A** dieselized ferry is now carrying on tradition at Aurora, Indiana, where ferry service across the mighty Ohio River to Kentucky has been provided since about 1850. Two horses on a caged, chain-like treadmill originally provided the power to turn 4 ft. x 8 ft. paddle wheels. There was no reverse and the boat had to be turned about with long poles at each bank after completing a crossing. The boat was wood and three road wagons and teams were a demanding load.

During the winter of 1918 the Ohio froze so deeply that millions of acres of farmland were flooded

when the breakup came. Steamers were crushed and the Aurora ferry was buoyed up on a mountain of ice. She sat high and dry on a one-story high ice bar and when the thaw came the historical little ferry was impaled on a four-foot iron fence. The craft was partially dismantled and rebuilt and once again returned to duty. In 1923 the old ferry was replaced by the Etta Belle which was driven by a huge one-cylinder gas engine that turned her wheels by means of a large jackshaft. In 1940 a new owner changed the Etta Belle over from gas to diesel and ran her so until another boat, the Everett Lee, was bought in 1945 to take over.


The Everett Lee was built in 1931 by the Jeffersonville Boat Company, Jeffersonville, Indiana. The 20 ft. x 60 ft. hull is all steel and will accommodate six automobiles or one loaded semi-trailer truck. Two Jantz and Litz 10 hp. electric motors turn the 4 ft. x 8 ft. wheels at 36 rpm. to send the ferry churning over the one-half mile crossing at a 7 mph. clip. A 78 hp. Caterpillar diesel electric set develops 230 volts dc to operate the eight electric motors on board. Without taxing its 60 ton capacity, the Everett Lee hauls about 200 motor vehicles across the river in 12 hours and is in operation with few exceptions every day.

70



FEBRU





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*keep engines Clean*

For lubrication counsel, see your nearest Supplier of Sinclair Products or write direct to Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y.

## New Diesel Freighters From French Yards

Five similar diesel engined freighters of a gross tonnage of 4,500 each are building or have been built at the Caen yards of the Chantiers Navals de Caen. They are the *Ange Schiaffino* which was launched last March and delivered to her owners Messrs. Schiaffino of Algiers in December; the *Monique Schiaffino*, which was delivered last June; the *Marie Louise Schiaffino*, delivered last month; another not yet christened and intended for the same owners will be launched this month; and the fifth vessel which will be operated by Acieries de la Marine et Homecourt had her keel laid in December. All the vessels have an overall length of 414

feet 4 inches, a breadth of 54 feet 6 inches, a full load tonnage of 9,180 and 4,200 horsepower. They each have one single 8-cylinder, two stroke Burmeister & Wain engine with a bore of 620 mm. and a stroke of 1,150 mm.

## Acquires GM Franchise

The Texas Panhandle north of Lubbock will be serviced by Diesel Power, Inc. which has acquired the GM diesel franchise for that area. The organization will carry a complete line of engines and parts in Plainview, with a complete shop for overhauling and rebuilding. Field service will be maintained by means of field cars equipped with service units. Each car has its own source of 110 volt ac

current, 12 volt dc. current for charging batteries and compressed air for engine washdowns, paint guns, and air tools. The major market in this area is the irrigation business with some petroleum business in the northern section of the Panhandle.

## Changes Company Name



Effective January 1, 1952, on the occasion of its fiftieth anniversary, Chicago Metal Hose Corporation became Flexonics Corporation. Commenting on the change, Mr. J. F. Farrar, president, said that the spectacular growth of the company and the development of varied product lines made it desirable to select a new corporate name more representative of the broad scope of company activities. Established in 1902, the company was among those pioneering in the development of flexible metal hose and tubing for industrial uses. Flexonics Corporation now manufactures more than 150 products including aircraft parts and assemblies, pipeline extension joints, instrument control bellows and automobile thermostats in addition to all types of flexible metal hose. The company is now building its sixth manufacturing plant in Memphis, Tennessee. This modern plant, scheduled for completion early in 1952, will be used to expand production of aircraft assemblies, urgently needed for the defense program. Flexonics Corporation has four U. S. plants located in Maywood, Elgin, Rock Falls, and Savanna, Illinois; an eastern assembly warehouse in Elizabeth, New Jersey, and a Canadian subsidiary at Brampton, Ontario. The general offices of the company are at Maywood, Illinois.

## The Diesel Tug FRANZ



Recently launched and now giving an excellent account of itself in New York Harbor is the 55-ft. diesel tug *Franz*. Powered by twin GM Series "6-71" engines and featuring a hydraulic booster steerer, the vessel is a highly maneuverable "one-man" craft. The GM engine drives through reduction gear a 3-bladed all bronze propeller. The tug is of all steel construction, providing quarters for a crew of four. Visibility is 100%, made possible by a well designed pilot house which has a generous number of aluminum framed double-hung self-balanced windows. The design is the standard "Equity" design of Equitable Equipment Company, Inc., 410 Camp Street, New Orleans, La., builder of this and similar craft.

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President

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## Scrap Is Needed

Because a critical shortage of scrap threatens to close furnaces in a matter of weeks or days which would result in serious curtailment of both military and civilian production a Business Papers Emergency Conference was called in Washington December 14th. Addressing more than two hundred editors, Charles E. Wilson, Director of Defense Mobilization called for a new sense of Urgency. He expressed his belief that the way to Peace is through Might and went on to say that we are facing drastic increases in demands for metals. Mr. Wilson called for all out collection and channeling of scrap.

Manly Fleishmann, Administrator, DPA-NPA, told the group that we have a long way to go before National Security is assured. Our need for nickel is now greater than the world supply, showing that we may no longer consider ourselves a "have" nation, he said. Mr. Fleishmann pointed out that this is not a long range problem—the immediate need is to get through the winter, and the most acute area is that of scrap. Of greatest importance is ferrous scrap, but also in serious shortage are copper, aluminum, brass, bronze, lead and zinc. He called first for immediate intensifying of the drive for iron and steel scrap and secondly for all out effort on nonferrous metals.

Keynote of the conference was "Wherever there is Business there is Scrap." It may be "production scrap" or "dormant scrap." It's the dormant scrap which does not flow to mills normally, that's so badly needed today. Dormant scrap is found wherever obsolescence, wear, accident, damage or other causes have brought retirement from active service of products containing steel, iron, copper, brass, bronze, aluminum, lead and zinc. Examples are: abandoned bridges, streetcar rails, etc.; locomotives, freight cars out of service; farm equipment beyond repair; condemned ships; obsolete machinery, tools, jigs, dies, fixtures and other equipment in industry including items broken, worn beyond repair, abandoned, dismantled or in need of replacement parts no longer obtainable.

Production scrap—the scrap that accumulates in plants working with metal—usually takes the form of turnings, borings, clippings, punchings, chips, trimmings, plate ends, etc. This normally flows from industrial plants to scrap dealers as quickly as it accumulates. Only if it is being thrown on the dump do we need concern ourselves with its disposition.

The main job is to get the dormant scrap out. And the following basic instructions, if followed by every business, can assure success of the expanded recovery program: 1. *Go after dormant scrap*—Start an emergency inspection and inventory of all heavy steel, whether machines, equipment, beams or plates. Dispose of everything you possibly can to a scrap dealer. 2. *Delegate authority*—The top executive of every industrial and commercial establishment, large and small, should appoint someone with authority to act in cleaning out dormant scrap. 3. *Appoint a salvage committee*—In large industrial firms the chief executive should insure complete coverage by appointing a salvage com-

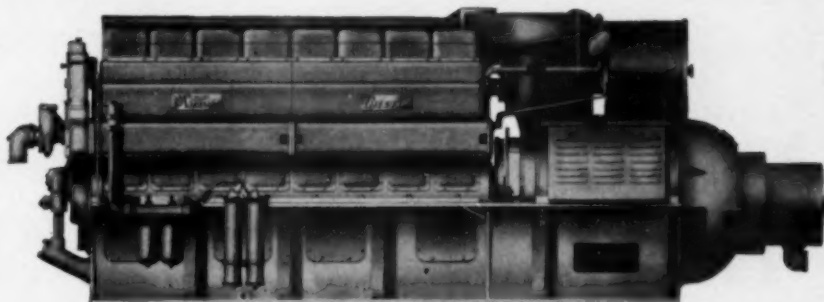
mittee with authority to determine what is scrap and to order its disposal. The committee should: Search all plants and properties, regardless of size, for dormant scrap; survey potential wrecking and dismantling projects that will produce scrap; make disposition of all production and dormant scrap as quickly as possible. 4. *Put scrap collection on a "housekeeping" basis*—Make it the personal responsibility of the committee chairman to initiate a program to clean out the dormant scrap and to make a scrap survey every 30 days. Besides increasing the supply of scrap, continuous scrap recovery from questionable old stand-bys, obsolete machines and equipment reduces taxes through inventory write-off, improves safety conditions, gives lowered insurance rates and clears valuable space.

## Diesel Locomotives Increase

As of last November, latest figures reveal that railroads had 1,742 locomotives on order. Out of that number 1,719 were diesel, 21 were steam and two were electric. The number of new locomotives placed into service during the first ten months of 1951 totaled 2,135 which included 2,117 diesel, 16 steam and two electric.

**DIESEL ENGINE CATALOG** is now available in its Sixteenth expanded edition. Completely revised and re-edited, it is an invaluable aid to design engineers and buyers. Fully illustrated. \$10.00. Order now from **DIESEL PROGRESS**, P.O. Box 8458, Cole Station, Los Angeles 46, California.

# Sterling Viking Diesels definitely lower costs of power production



Model VDS-8S, 600 KW Generator Set. Viking Diesel "packaged unit" generator sets are available in 6 and 8 cylinder models. Bulletins 1024 and 1028 contain sectional views, fuel consumption curves, engineering and installation details. Sent on request.



We have the evidenced facts to show any user of diesel electric generator sets that the newly engineered Sterling Vikings can cut KW hour production costs as much as 50 per cent.

Fuel consumption, engine weight, compactness, housing, installation, parts cost, general maintenance—all are factors in the service

worth of a generator set. On every point Vikings offer proven advantages confirmed by comparison. In diesel engineering, Sterling has come up with design developments that have the industry talking. We would like to give you this story of lower power costs first hand. Write us for latest Sterling Viking Diesel literature.

# Sterling

MARINE AND INDUSTRIAL  
**ENGINES**



Diesel, Gasoline, Gas — 4, 6 and 8 cylinder — 30 HP to 1,000 HP

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● Depend upon Sterling Diesel Power for Locomotives, Generator Sets, Commercial and Fishing Craft, Lift Bridges, Ventilating Systems, Drilling Rigs, Etc.



## FREEZING "CATS"

By E. F. DENNIS

**I**N the season of 1950-51 Florida packed and sold close to 31,000,000 gallons of concentrate citrus and during the current season the state's citrus industry will pack approximately 45,000,000 gallons of this fast selling product. In another 5 years, 75% of the oranges produced in Florida will be used for concentrate.

Diesels are helping to bring new fortunes to the citrus grove owners of Central Florida, by protecting their fruits of labor through freezing the concentrates from the citrus fruit. Because Florida is subject to hurricanes and tropical storms, the new warehouse of the Central Florida Refrigerated Warehouse Corp. at Plymouth, Florida needed a reliable source of standby power. Shelly Tractor and Equipment of Miami was called in to supply and engineer the installation of the standby power plant, which consists of two model D 397 Caterpillar diesel engines. In case of power failure these "Cats" will be responsible for the refrigeration of the world's largest zero degree refrigerated warehouse for concentrated citrus.

This warehouse with a floor space of over 2,000,000 cubic feet, lies in the heart of the Florida citrus belt and contributes greatly to the wealth of the grove owners for miles around, as it holds over \$22,000,000 worth of concentrated citrus products. The whole warehouse is divided into four sections

and is refrigerated from one central "reefer" room which has a York 16 cylinder radial ammonia compressor. The two "Cats" have a 500 maximum hp. and a 400 continuous hp. with a 300 kw. General Electric generator and a 125 volt-40 amp. exciter at 1200 rpm.

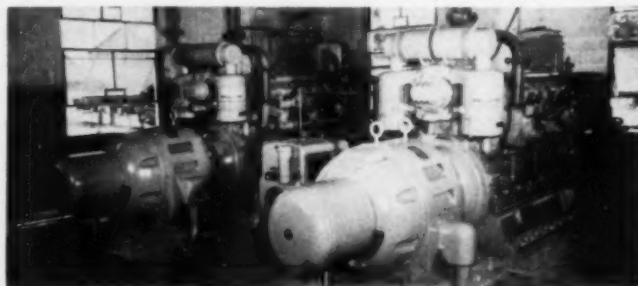
The starting mechanism consists of a 31 hp. 4 cylinder Wisconsin gasoline engine, which is installed between the 2 "Cats" and "V" belted to a clutch with a handle which engages the starter drive pinion gear on each Caterpillar. For cooling they use a 275,000 gallon fire water tank, along with a Ross heat exchanger and an atmospheric cooling tower.

During the 72 hour test run conducted by the

Shelly engineers, Steve Darlington and Bob Mitchell, these engines were subjected to a high of 700 amps and a low of 400 amps; no fluctuation and no voltage drop could be detected to any degree. They held their full load regardless of what was thrown at them. "The sensitivity of the Woodward U.G.8 governors and the way the engines responded during this test was wonderful," remarked Bob Mitchell.

During the 72 hour test run the hourly fuel consumption was 20.5 gallons per engine, Sinclair Tenol #30 lube-oil as well as Sinclair fuel oil was used. The plant and warehouse for this new industry were designed by Harry M. Lorback of Winter Park, Florida. Mangum and Butler of Miami were the construction engineers.

The two Caterpillar model D 397 diesel engines, 500 maximum hp. and a continuous 400 hp., with the 300 kw. GE generators responsible for \$22 million worth of frozen citrus concentrates.



## Honan-Crane

### Oil Purification

...first choice to protect all 80 Nordberg Diesels at Kaiser Aluminum's huge new Chalmette Plant

In the giant Kaiser Aluminum and Chemical Corp. plant 80 Honan-Crane Oil Purifiers maintain a continuous supply of clean, safe cylinder and crankcase oil for 80 eleven-cylinder, 1820 HP Nordberg gas engines. Again, experienced diesel engineers have specified Honan-Crane for safe, dependable protection against breakdown and excessive wear due to contaminated oil! Honan-Crane Oil Purification (for either inhibited or straight mineral oils) protects bearings, cylinder walls and other finely machined parts from improper lubrication and costly damage often caused by solid abrasive contaminants or by acids, gums, resins and other products of oxidation. Write today for complete information about Honan-Crane Fuel and Lube Oil Purifiers.



**Honan-Crane Corporation**  
202 Indianapolis Ave., Lebanon, Indiana  
A Subsidiary of  
**Houdaille-Hershey Corporation**

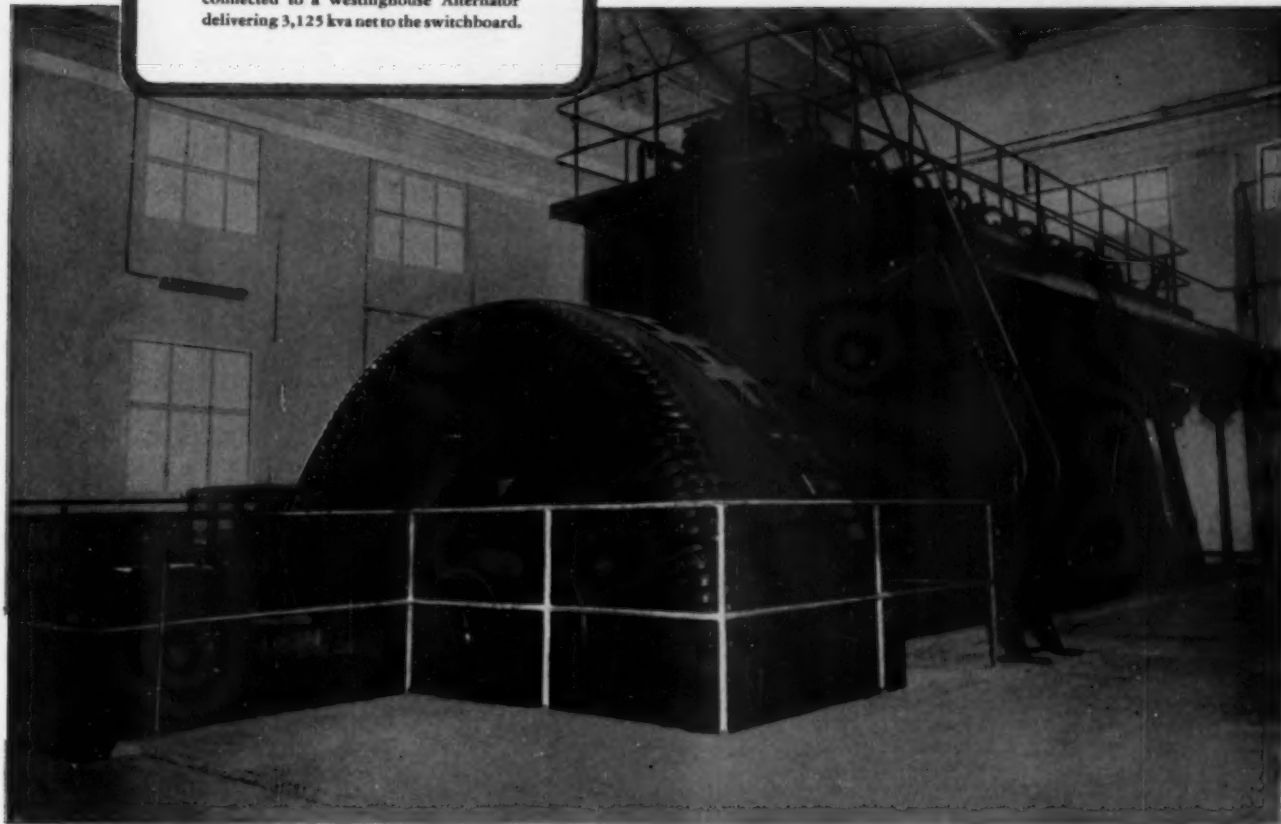
OIL FILTER MANUFACTURER



Shown above: One of the two engine rooms in the Kaiser plant. Each room contains 40 Nordbergs and 40 Honan-Crane Oil Purifiers.



This is the first American-made engine generator unit installed at the power plant of the Bermuda Electric Light Co., Ltd. The Nordberg Diesel Engine is direct-connected to a Westinghouse Alternator delivering 3,125 kva net to the switchboard.



## This generator unit turned the tide at Bermuda

Here is the first American generator unit installed at the Bermuda Electric Light Co., Ltd. Prior to 1939, all the generating units were of British make. This unit changed the pattern . . . consisted of a Westinghouse Generator and a Nordberg Diesel Engine. The outstanding performance of this unit was responsible for another similar installation in 1950.

Westinghouse Generators create such acceptance because of their reliability—long life—performance. Once you specify Westinghouse you'll always specify Westinghouse. Take the fabricated steel rotor . . . it has been designed with such a high factor of safety that it is practically unbreakable. The all-steel frame makes possible a stator assembly having maximum strength and the permanent tightness of core that is necessary for a quiet, smooth-running machine. Electrical efficiency is tops, too . . . materials are so proportioned that

the maximum efficiency of conversion is obtained from three-quarters to full load.

Call your Westinghouse Power Apparatus Specialist for complete consultation on your generator installations. He will work with you on the design, selection and application of the right equipment. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-10362

YOU CAN BE SURE . . . IF IT'S

# Westinghouse

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**A-C GENERATORS**



### Vice President in Charge of Service

Mr. Harry Bernard, of Mack Manufacturing Company, formerly chief engineer, has assumed the duties of vice president in charge of service. In a statement released by Mr. E. D. Bransome, president of the organization, he said that this post was set up in recognition of the fact that servicing of products once they reach the field is of paramount importance and that over-all administration requires constant technical and administrative experience. Mr. Bernard will have the responsibility of coordinating the work of the service department with that of all other divisions. Messrs. Corr and Lunda, who have been acting in the service division as director and assistant director respectively,

will continue in the division and report to Mr. Bernard. Mrs. T. J. Zeller, formerly factory manager at Allentown, succeeded Mr. Bernard, assuming responsibility for the operation and administration of the engineering department as vice president and chief engineer. The realignment of personnel did not affect the management of the parts supply division which continue under Mr. G. C. Grantham.

### Honeywell Opens District Office

A new district office has been opened at Harrisburg, Pa., by Minneapolis-Honeywell Regulator Company. The new office, located in the Kline Village development, was made necessary, Honey-

well officials said, by an increasing demand in the Harrisburg area for process measuring and controlling instruments and for heating and commercial controls. William J. Brosch and Jack Caylor will handle sales for the company's Brown Instruments division. John Hopkins will handle commercial, and Donald Schmick heating controls division sales.

### New Series of Fork Lift Trucks



The FT series of fork lift trucks embodying the latest advancements in engineering, styling, accessibility and operating work performance, has been announced by The Buda Company, Harvey, Illinois. The new Buda "safelined" designed FT series of fork lift trucks powered with either a Buda diesel or Buda gasoline engine, are available in 12 models on solid or cushion tires in capacities of 3000, 4000, 5000, 6000 and 7500 pounds at 24 inch load center and 4000 lbs. capacity at an 18 inch load center. Every part and assembly of the Buda FT series fork trucks is strictly functional and engineered for safety, easy operation, long life, low cost maintenance and "less-down-time" servicing with over 85% of replaceable parts interchangeable between all 12 models.

Special features of Buda's FT fork trucks include: all roller construction mast with special rolled mast channels; two speeds forward and two speeds reverse single lever gear shift; quick change heavy duty clutch; complete complement of electrical gauges on full front vision instrument panel; carriage mounted on patented adjustable side thrust rollers to reduce wear; complete accessibility of all parts for maintenance and servicing; and standardization and interchangeability of parts between all 12 models. Powered with a Buda gasoline or a Buda diesel engine of identical cubic inch displacement, bore, stroke, and mounting dimensions, the "safelined" FT series of fork lift trucks are all available in five standard masts with a 72-inch, 84-inch, 108-inch, 114-inch, or 120-inch lift. For further information or an illustrated bulletin, write The Buda Company, Harvey, Illinois.



## CONTROL POWER BETTER

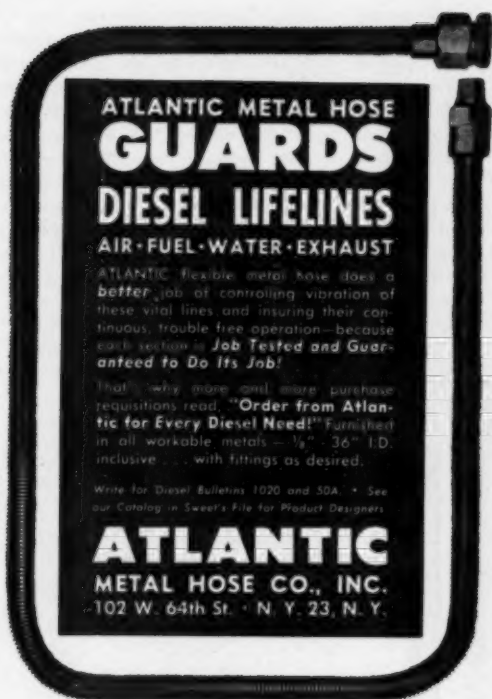
### STOP and GO ENGINEERING

ROCKFORD engineered clutch applications are serving successfully in machines that vary from tiny, precision instruments to the largest, heavy-duty tractor. This diversity has built up a breadth of experience that is of timely value to product designers. Call in a ROCKFORD clutch engineer, the next time you are up against a power transmission problem, and benefit from over a quarter century of experience in making thousands of clutch, power take-off and speed reducer applications.

**ROCKFORD CLUTCH DIVISION**  
BORG-WARNER  
1321 Eighteenth Street, Rockford, Illinois

# ROCKFORD CLUTCHES





**ATLANTIC METAL HOSE GUARDS DIESEL LIFELINES**  
AIR • FUEL • WATER • EXHAUST

ATLANTIC Flexible metal hose does a **better** job of controlling vibration of these vital lines and insuring their continuous, trouble-free operation—because each section is **Job Tested and Guaranteed to Do Its Job!**

That's why more and more purchase requisitions read, "Order from Atlantic for Every Diesel Need!" Furnished in all workable metals— $\frac{1}{2}$ "—36" I.D. inclusive—with fittings as desired.

Write for Diesel Bulletin 1020 and 50A. • See our Catalog in Sweeney's File for Product Designers

**ATLANTIC METAL HOSE CO., INC.**  
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**POWERENCH TOOLS**

for diesel engine maintenance

THE SWE-71 TORQUE TESTER pictured here accurately tests all torque wrenches in a matter of seconds.

201. Send me information on complete line of Sweeney POWERENCH Tools.

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Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_

**B. K. SWEENEY MFG. CO., DENVER 17, COLO.**



These Fram Filcron Filters clean about 100 gallons of oil an hour at temperatures of 150-160 degrees for INVADER'S 180 hp Superior Diesel Engine.

**"I rate FRAM 100%  
for any diesel owner!"**  
*says fishing boat engineer*

Fram Filcron Filter installation guards diesel engine of fisherman *Invader* of New Bedford, Mass., from costly and dangerous power stoppage due to oil contaminants . . . wins praise of boat's engineer, Arnold W. Bower. Without dependable diesel operation, fishing trips are unprofitable . . . and in bad weather uninterrupted power is vital to boat's safety.

Fram Filters contribute to *Invader's* profits by reducing down-time . . . keeping the *Invader* at sea for maximum lengths of time under all conditions. And the cost of Fram protection is small. Mr. Bower states, "replacing one essential bearing would be more than a year's filtering cost. I rate Fram 100% for ANY diesel owner."

### **Solve Your Filtering Problems with FRAM!**

Whatever your filtering problem—lube or fuel—Fram Filters are the solution. Let Fram's Engineering Department PROVE that Fram Filters remove ALL engine-killing contaminants one micron (.000039") and larger . . . resulting in less down-time, lower operating costs for you. Make your diesels produce at lowest possible cost . . . write TODAY to the Fram Corporation, Providence 16, R. I. In Canada: J. C. Adams Co., Ltd., Toronto, Ontario.

**FRAM Filcron**  
THE MODERN OIL FILTER

## Appointed to N. Y. District Office



Roy W. P. Johnson

Johnson was on contract with the Andian National Corporation as mechanical engineer in Colombia,

The Cooper-Bessemer Corporation has recently expanded the company's sales engineering facilities with the appointment of Roy W. P. Johnson to its New York office. Prior to his comprehensive engineering training on engine and motor-driven compressors at Cooper-Bessemer's factory in Mount Vernon, Mr.

South America. In this capacity he supervised the construction of hangars, roads and housing. Mr. Johnson is an engineering graduate of Kingston-on-the-Thames Technical College in England and has spent two years in the Research and Design Departments of the Electrical Musical Industries, Hayes, Middlesex, England. Upon first coming to America, he was an instructor in the Engineering Department, Ajax Division, University of Toronto. Mr. Johnson's efforts in the New York district will be under the direction of James W. Reed, where he will consult with engineering firms in regard to the design and construction of major pipe lines, petroleum processes, allied refining and industrial applications in which Cooper-Bessemer engine and compressor equipment is so widely used.

# Eaton Diesel Engine Valves, Bolts, and Studs



Produced to meet the  
exacting requirements of  
Diesel Engine Service

A background of many years of experience as suppliers to the Diesel engine industry gives Eaton a thorough understanding of the peculiar problems encountered in this highly specialized field. Eaton has made far-reaching engineering contributions applicable to practically all types and sizes of Diesel engines. Greatly enlarged manufac-

turing facilities now permit the production of highly-stressed main-bearing and connecting rod bolts with forged heads, under strict metallurgical and quality control.

You can utilize Eaton's long experience in this field by giving our engineers an opportunity to work with yours in the early stages of design.

## EATON MANUFACTURING COMPANY

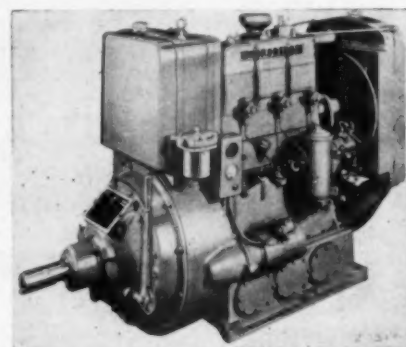
CLEVELAND, OHIO

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**PRODUCTS:** Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axes • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamometer Drives, Brakes, Dynamometers

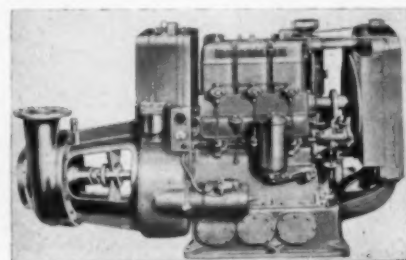
## Adds 3-Cylinder Diesel to Line

Addition of a new, three cylinder diesel engine, conservatively rated at 30 to 45 horsepower within a speed range of 1200 to 1800 rpm., is announced by Nordberg Manufacturing Company, Milwaukee 1, Wisconsin. The new power unit supplements the Nordberg 4FS one and two cylinder, 10 to 30 horsepower diesel engines. They were developed to meet the need for low cost, compact, heavy duty engines in the small horsepower field. This new engine, known as the 4FS3, is now in production at Nordberg's Milwaukee plant. It has a 4½ inch bore and 5¼ inch stroke and is a four-cycle, vertical, mechanical injection diesel engine. Built as a complete, self-contained, ready to operate unit, it is available as an electric generator set, pumping unit and with clutch or stub shaft power take-off for direct connection or belt drive. This dependable power unit is also available with heat exchanger cooling for marine auxiliary applications.



The Nordberg 4FS3-DE with clutch power take-off for direct connection or belt drive, 30 to 45 hp. at 1200 to 1800 rpm.

The Nordberg 4FS3 generator set is completely equipped and is delivered ready to connect to lead. It is available in direct or alternating current models from 20-30 kw. in all standard voltages, 50 or 60 cycle. This unit is built to economically generate light and power for large magnets, sand and gravel plants, saw mills, resorts and tourist courts, oil field rigs and other auxiliary equipment, etc., and for standby service for public buildings, airports, small manufacturers, hatcheries, locker plants, dairies, etc. These generator sets are also especially well adapted for use as marine auxiliary units, aboard tugs, fishing craft and other vessels.

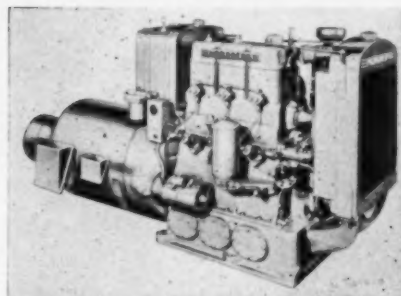


With centrifugal pump attachment, the 4FS3-DE has a pumping capacity of 500 to 5000 gpm. at 20 to 220 foot head.

Built with side suction, two ball bearing pumps, with statically and dynamically balanced impellers, the Nordberg 4FS3 pumping unit has a capacity of

DIESEL PROGRESS

500 to 3000 gpm. at 20 to 220 feet head. Its compact design and smooth efficient operation makes it particularly applicable for washing, draining, dredging and general pumping service in the contracting and quarry industries. Also it is equally well suited for use in the irrigation field for sprinkler or flood irrigation. Nordberg 4FS3 diesel engines with direct or clutch power drives are readily adaptable for replacement engines in hoists, small shovels, etc., and can also be used as a power unit for driving well drilling machines, compressors, blowers, saw mills, oil field pumps, etc.



Nordberg 4FS3-CE generating unit for stationary and portable power applications and marine auxiliary uses, ranging from 20 to 30 kw., d.c. or a.c., 50 or 60 cycle.

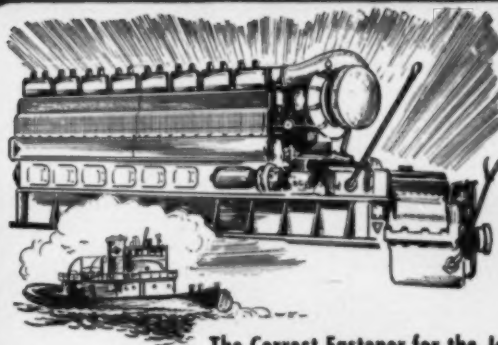
As with the 4FS one and two cylinder units, the three cylinder engine is constructed to assure efficient, reliable service with minimum maintenance.

It is designed to start and operate on regular diesel fuels. Electric starting equipment includes a starting motor and a "V" belt driven battery charging generator which is provided with voltage regulator and reverse current protection. The engine can also be supplied with manual starting only, if desired. A simple compression release is provided to facilitate hand cranking. The 4FS3 is built for stationary applications with a radiator type cooling system which provides efficient cooling of the combustion chamber, fuel injection nozzles, valves and exhaust passages. Cooling water temperature is automatically controlled by a thermostat and recirculating connection installed on the outlet manifold. For marine auxiliary applications, the unit is supplied with jacket water heat exchanger, surge tank, jacket water and raw water pumps and the same automatic temperature control features. A diaphragm type fuel oil transfer pump with hand priming lever, is actuated by the camshaft. All fuel is strained and filtered three times before passing to the fuel injection pumps which deliver the fuel to the injection nozzles at high pressure through heavy steel tubing. A mechanical flyball type governor, gear driven from the camshaft, regulates fuel delivered to the nozzles in accordance with the load on the engine. The 4FS3 engine is another unit in the extensive line of Nordberg two and four-cycle diesel engines which range in size from 10 to 9600 hp.

**DIESEL ENGINE CATALOG** is now available in its Sixteenth expanded edition. Completely revised and re-edited, it is an invaluable aid to design engineers and buyers. Fully illustrated. \$10.00. Order now from **DIESEL PROGRESS**, P.O. Box 8458, Cole Station, Los Angeles 46, California.

FEBRUARY 1952

## For DEPENDABILITY IN DIESEL ENGINES



### The Correct Fastener for the Job

For over 38 years Erie has manufactured bolts and studs to the specifications of Diesel Engine builders. This specialized experience gained in working with leading Diesel designing engineers assures you of getting the exact materials and the precise tolerance in bolting desired for your Diesel. Send us your specifications for Diesel Connecting Rod Bolts, Cylinder Head Studs, and other special bolting.



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ALLOYS • STAINLESS  
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Representatives in Principal Cities.



## High Altitude Highway



Regrading, straightening, and widening 6.8 miles of U. S. Route 550 in the Molas Lake Pass region,

just south of Silverton, Colo., forces dieseled machinery to operate at an average altitude of 10,000 feet. Northwestern Engineering Company of Denver is using an International TD-24 crawler, a Bucyrus-Erie 38B shovel, and an Adams 610 motor-grader on this lofty project. Scheduled to be finished with blacktop and ready for traffic early in 1952, this stretch of road climbs from 9,300 to almost 11,000 feet above sea level.

## Penn Changes Name

The firm name of the Penn Electric Switch Co. has been officially changed to Penn Controls, Inc. according to an announcement issued by Albert Penn, president. Explaining the name change Mr.

Penn stated that for some years they have considered changing the name of the company to describe more accurately the character of the business. The announcement emphasizes that the name change will not in any way alter management, general policies, or operation of the company; nor will it have any effect on contracts, agreements or purchase orders. Penn Controls, Inc. manufactures automatic controls for heating, refrigeration, air conditioning, gas appliances, engines, and pumps and air compressors.

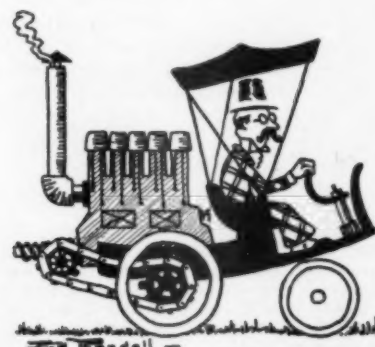
## Dr. "I.Q." Takes The Throttle



Jimmy McLain, better known to millions of radio listeners as the original "Doctor I.Q., The Mental Banker," climbs aboard "Big Red," an International TD 24 crawler tractor on exhibit at the State Fair of Texas in Dallas. A native Texan, and now an ordained minister, Mr. McLain served as master of ceremonies for the big variety show presented by International Harvester at the company's exhibit.

## Exhaust Hose Bulletin

An illustrated bulletin describing flexible metal hose and tubing for diesel applications has been released by Flexonics Corporation, Maywood, Illinois. This bulletin deals with CMH diesel exhaust hose—Rex-Weld corrugated types for higher pressure installations and Rex-Tube convoluted types, essentially used where long lengths of flexible exhaust tubing are required. Also covered are Rex-Weld types for diesel air, oil and fuel lines, and standard fittings for all diesel exhaust hose types. The new bulletin was published to meet the widely expanding conditions in the diesel industry. For a copy, write to the Flexonics Corporation, 1315 South Third Avenue, Maywood, Illinois, requesting bulletin CMH-124.



DIESEL PROGRESS



**PRECISION FINISHING** } interchangeable parts—  
lower maintenance costs

Even the heaviest parts of every FULTON DIESEL are craftsman-machined to such close tolerances that they are completely interchangeable. Result:

- Smoother running — higher operating efficiency
- Greater fuel economy — less wear and tear
- Quick, easy replacement saves time and money

WHERE DEPENDABILITY COUNTS, YOU CAN COUNT ON FULTON

**FULTON IRON WORKS COMPANY**  
SAINT LOUIS 14, MISSOURI

## At "Open House"



At the recent "open house" of the Van der Horst Corporation plant at Olean, New York, examining a large diesel cylinder restored by plating nearly 1/4-inch Vanderloy on the bore diameter. Left to right: Dr. Hendrick Van der Horst, president; Mr. Wilbur A. Young of DIESEL PROGRESS; and Mr. J. A. Andriess, vice president in charge of sales, Van der Horst Corporation.

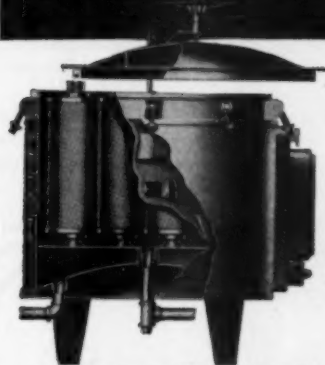
### A Lube Oil Man's Prayer

The following are basic points and practices essential to the establishment and perpetuation of a successful diesel locomotive operation: 1. A complete freedom from prejudice and a full acceptance of the new type power and, most important, the will to maintain a new type power properly and to inculcate in all subordinates the same ideas. This includes the establishment of many sound practices new to steam men and the abandonment of many old practices of a traditional nature.

2. Proper education of personnel and the insistence upon supervision and subordinates alike, including road foremen of engines, commonly called traveling engineers, and the enginemen themselves that the work be thoroughly and properly done. Included in this education is the necessity of following recommendations of manufacturers and supply representatives until such time as experience and other knowledge gained from the operation dictate otherwise. Also, included in this education during the transition from steam to diesel is the teaching of all personnel to keep their work, their surroundings, and themselves clean. They must be taught and supervision must insist on thorough work, as we have found that work of a perfunctory nature is the source of most of our maintenance troubles, and deviation by enginemen from recommended practices for handling of equipment on the road is another great trouble source.

3. A complete and dependable record system is most essential. In our opinion, a diesel maintenance operation cannot be carried on successfully when dependence is placed on the memory of individuals or pocket records. Such a record should be one so set up and maintained that reference can be made to such records at any time during the twenty-four hour period of each day, and the information desired readily located.

## THE CHOICE OF MORE AND MORE ENGINE BUILDERS AND OPERATORS



### HOFFMAN FILTRATION EQUIPMENT

Designed to meet your needs . . . built to give you the service you want . . . with maximum economy and convenience of operation proved in scores of installations.

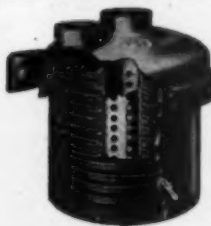
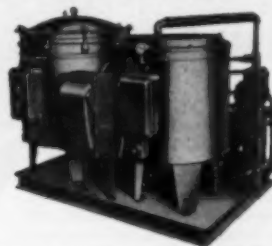
As buyer or builder of diesels, it will pay you to get complete details on the Hoffman filtration line. Literature and data are yours for the asking—TODAY.

#### HOFFMAN CARTRIDGE FILTERS FOR DIESEL FUEL AND LUBE OIL.

Feature a new high in modern, efficient design. An exclusive cover-lifting device simplifies cartridge removal. Swing bolts fasten the cover — assure quick, easy cartridge replacement. Available in two series, for either 7 x 18 Navy size throw-away cartridges in multiples of 1, 2, 4, 7, 9, 14 and 18 cartridges. Or, for 11 x 18 cartridges, either re-packable or throw-away types, in multiples of 1, 2, 3, 4, 6 and 8 cartridges. Provide continuous clarification on shunt or by-pass basis. With or without heaters and controls.

#### COMPLETE PURIFICATION OF USED LUBE OIL IN THE HOFFMAN OIL CONDITIONER

Save yourself the high maintenance cost of centrifuges. Removes both insolubles and solubles (oil, gas, moisture, fuel dilution). Only two moving parts . . . no steam or water connections. Models with capacities from 25 to 600 g.p.h.



#### HOFFMAN DISC FILTER

Three sizes of this compactly designed filter to handle 1 to 10, 5 to 50, and 50 to 125 gallons per minute. Removes impurities from 3 to 5 micro inches. Low first cost . . . no moving parts . . . minimum maintenance.

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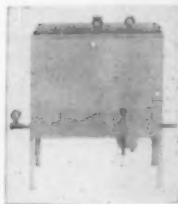
DIVISION

UNITED STATES HOFFMAN MACHINERY CORPORATION

212 LAMSON STREET, SYRACUSE 6, NEW YORK

CANADIAN PLANT: CANADIAN HOFFMAN MACHINERY CO., LTD., NEWMARKET, ONT.

## Introduces New Separator



Simplicity of design and efficient, economical operation are featured in Honan-Crane's newly created Houdaille PurDry Water-Oil Separator, for turbine, hydraulic oils or any industrial oil purification problem where water is a troublesome factor. Said to reduce water content of oil to an insignificant trace (less than one-tenth of one percent) the manufacturer states that the Houdaille PurDry Water-Oil Separator provides, for the first time, a simple, practical method

of separating water from oil. In describing the significance of water separation from oil, Honan-Crane officials point out, for example, that water in the oil is one of the most frequent causes of turbine lubrication failure and one of the most difficult to eliminate. The presence of water in oil promotes the formation of sludge containing products of oxidation which clog channels and orifices in bearings, pumps, governors, hydraulic cylinders, valve mechanisms, and other vital machine parts, invariably resulting in impaired efficiency if not in serious damage to the equipment.

In many cases, oil which has become contaminated with appreciable amounts of water must be discarded. This condition sometimes occurs, particu-

larly in the case of auxiliary turbines, after only a few days or weeks of operation. Designers of the Houdaille PurDry Water-Oil Separator claim that its use eliminates the necessity for changing or discarding oil regardless of the type of contamination encountered. This is attributed to the ability of the PurDry to perform a complete filtering service for removal of solid contamination, acids and other sludge-forming products of oxidation as well as water separation. Continuous operation of the PurDry unit on by-pass circulation keeps the oil in safe operating condition at all times. For complete information write to the Honan-Crane Corporation, 202 Indianapolis Ave., Lebanon, Indiana.

## Elected Vice President



William G. Miller

William G. Miller, an engineer with more than 25 years' experience in locomotive and oil refining equipment production, was elected executive vice-president and a director of Montreal Locomotive Works, Limited, at a directors' meeting recently, according to Duncan W. Fraser, chairman and president. Mr. Miller assumed his new post in January. Mr. Fraser said. Formerly executive assistant to the president of American Locomotive Company in New York, Mr. Miller assisted in setting up tooling programs for the new line of diesel locomotives introduced by American Locomotive and General Electric Company in 1945. As superintendent of American Locomotive's diesel division at Schenectady, he was in charge of both diesel locomotive and diesel engine manufacturing. From 1948 to 1950, he was manager of Alco's Auburn diesel engine plant. From 1928 until 1940, with one two-year interruption, Mr. Miller was associated with American Locomotive's Alco Products division, chiefly in supervising orders for construction of gasoline refineries. From 1937 until July, 1939, he was in charge of the Alco Products office in Paris, supervising manufacture, installation and initial operation of oil refining plants in France.



The Chisholm Trail opened the way to cash markets for Texas longhorn cattle. Until then, they had been accumulating on the range and were practically worthless.

So are your worn out Diesel liners and crankshafts. But they needn't be! Just take the "For Scrap Only" tags off them and send them to us.

Our VANDERLOY M process restores their bearing surfaces to original dimensions. With addition of PORUS-KROME\* they'll wear as much as four times longer than they did without this protection. Yet the cost for BOTH processes is less than the price of new parts.

Think what this means! It eliminates all need to carry odd-sized parts. Best of all, it eliminates the chance of being caught by critical shortage of new replacements.

Most major Diesel users, guided by their own experience, now have original equipment processed with PORUS-KROME. It protects their investment!

You'll find it pays, too. Yes, whether you have Diesel liners and crankshafts that are new, old or discarded, VANDERLOY M and PORUS-KROME are the Chisholm Trail to more cash returns. May we prove it?

\* PORUS-KROME is a dense, hard, wear and corrosion-resistant chromium, produced by the Van der Horst Corporation of America, and which gives working surfaces an infinite number of tiny oil-retaining reservoirs for perfect lubrication.

**VAN DER HORST CORPORATION OF AMERICA • OLEAN, N. Y.**  
U. S. PATENTS 2,048,578, 2,314,604 and 2,412,698

**PORUS - KROME** VAN DER HORST



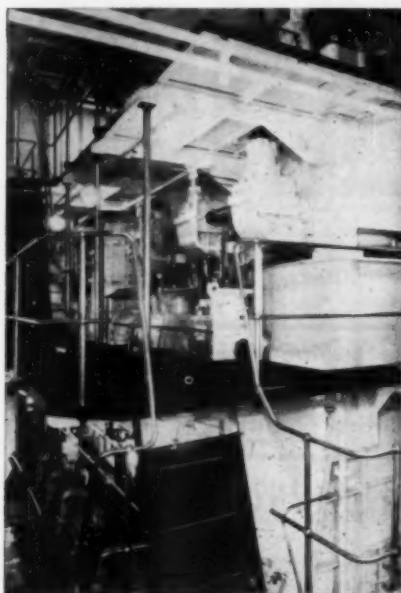
DIESEL PROGRESS



## Delivers Tanker



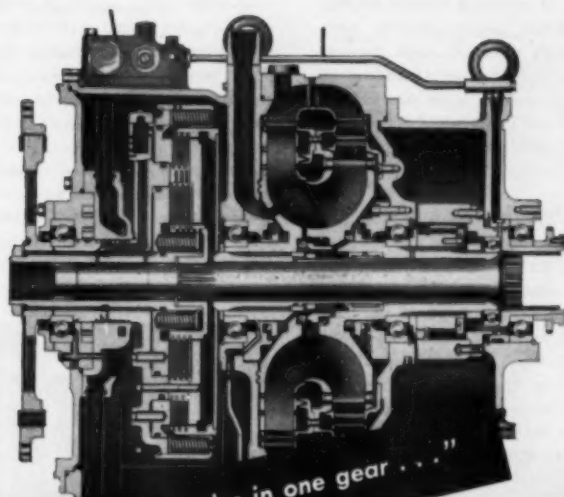
Burmeister & Wain of Copenhagen, Denmark recently delivered the motor tanker *Prometheus* which was contracted by Messrs. Jacob Odland S.S. of Haugesund, Norway. The ship was built to Norsk Veritas' class I.A.I., tanker for oil cargo, and to the rules of Norsk Skipkontroll. The vessel's length between perpendiculars is 465 feet, has a beam of 62 feet, 10 1/4 inches and a side height to main deck of 34 feet, 8 inches. The cargo capacity is 632,400 cubic feet. The gross tonnage is 8,675 tons. The main engine is one B & W direct reversible, single-acting, two-stroke, 6-cylinder crosshead engine with airless injection. Cylinder diameter is 740 mm., length of stroke is 1400 mm., capable of developing 5750 ihp., corresponding to about 4600 bhp. at 110 rpm.



The Burmeister & Wain 6-cylinder main propulsion engine.

The auxiliary engines consist of two 5-cylinder, single-acting, four-stroke trunk piston engines with airless injection, each direct connected to a generator of 185 kw. at 220 volts and 500 rpm. Welding has been widely used in the tanker's construction. Plating, deck and bulkheads as well as all tank intersections being fully welded, whereas frames and beams have been riveted. The cargo piping system comprises four 10-inch main pipes with 8-inch sucking-ports. Every tank has double shut-offs. There are four duplex pumps of 250 tons per hour and two 45 ton duplex bilge pumps in the two cargo pump rooms.

**DIESEL ENGINE CATALOG** is now available in its Sixteenth expanded edition. Completely revised and re-edited, it is an invaluable aid to design engineers and buyers. Fully illustrated. \$10.00. Order now from **DIESEL PROGRESS**, P.O. Box 8458, Cole Station, Los Angeles 46, California.



"Takes 13% grades in one gear . . ."

"Lets the engine do 90% of the braking . . ."

"Substantial savings on axles, tires and brakes . . ."



### Model DF Twin Disc Hydraulic Torque Converter

"Field reports of the Twin Disc Three-Stage Hydraulic Torque Converter with Direct Drive feature, in big heavy-duty trucks, are proving that 99% of forward gear shifting can be eliminated in off-highway operation. Extensive tests on the Mesabi Iron Range in this Twin Disc equipped Dart truck indicate that these converters can significantly reduce time on hauling cycles on this, probably the world's toughest trucking, with loads up to 30 tons and grades up

to 13%. Furthermore, very substantial savings on axles, tires, gears and brakes are reported."

That is the first paragraph from a just-published four-page bulletin on the new Twin Disc Model DF Three-Stage Hydraulic Torque Converter.

You'll want the complete story because never before have so extensive tests been reported on three-stage hydraulic torque converters with an *in-built* braking feature which no other torque converter can claim. Write today, and be sure to ask specifically for Bulletin No. 162. It may show you how to save thousands of dollars in truck operation.



**TWIN DISC CLUTCH COMPANY, Racine, Wisconsin** - HYDRAULIC DIVISION, Peabody, Illinois  
BRANCHES: CLEVELAND • DALLAS • DETROIT • LOS ANGELES • NEWARK • NEW ORLEANS • SEATTLE • TULSA

# AUTOMATIC ENGINE CONTROLS

By WILLIAM L. STELTER\*

**T**HE practicality of operating modern internal combustion engines under complete automatic control has been proven without question during the past ten years. An untold number of man hours have been saved through the efficiency of automatic controls and thousands of dollars have been saved by safety controls which have prevented unnecessary engine damage.

Perhaps the greatest call for automatic engine controls is for emergency generator sets. There are few hospitals today that do not have a stand-by generator and still fewer radio stations. In either case, loss of power creates a true emergency; not mere inconvenience. The availability and adaptability of automatic controls to any engine installation has made such progress in the past few years, that today these controls are a forethought, rather than an after thought, in the planning and building of any operation which will require power at all times.

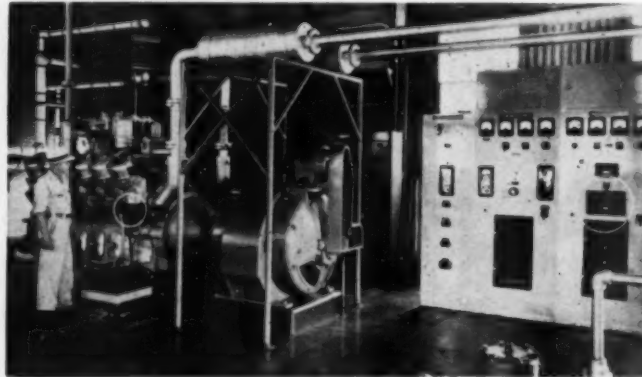
One of the more recent applications has been the installation of automatic engine-driven wind towers in California citrus groves for protection of fruit against frost. The engine driven propeller, mounted on a 50-foot tower, is slightly inclined toward the ground and in this manner drives the air at this level down to the ground whenever the

temperature drops to a predetermined point. The use of engines instead of electrical motors saves the cost of the substantial stand-by charges which are levied by all utilities companies when a motor of equivalent horsepower is connected to their lines, but seldom used.

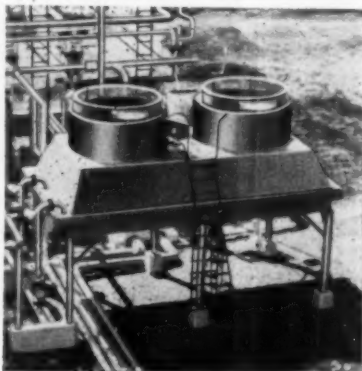
Gas and oil pipeline boosters stations have been particularly successful in using automatically controlled engines. One installation in Pittsburgh consists of two engine driven compressors whose function is to maintain constant pressure in the pipe line during periods of heavy demands. No. 1

engine starts when the pressure falls to a predetermined point. If No. 1 engine fails to maintain the necessary pressure, No. 2 engine cuts in to help take the load. Safety protective controls on these engines warn the operator of any abnormal condition in their operation and through this method, engine repair is held to a minimum. First year

*Right: Wind Tower on the ranch of Mrs. Palmberg at Glendora, Calif. Below: Synchro-Start controls used in gas pumping operation by Texas Eastern Transmission Corp., Lebanon, O.*



\*Chief Engineer, Synchro-Start Products.



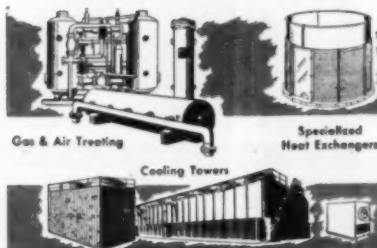
**Only Thorough Engineering  
and Adequate Sizing Can  
Give You Pritchard Quality!**

## New Pritchard Type "B" QUINTAIR\*

**Air Cooled  
Heat Exchanger**

Pritchard *quality* means a lot when it comes to selecting air cooled heat exchangers. Take Pritchard's Type "B" Quintair" for example. All parts requiring attention are readily accessible and easily serviced. Thoroughly engineered for long life and operating economy—adequately sized for top performance under the most exacting conditions—the Pritchard Type "B" Quintair" can handle one or several different heat loads in a single compact unit. Whatever your cooling problem, it will pay you to investigate the Pritchard Type "B" Air Cooled Heat Exchanger. *Write today for full information.*

\*Registered Trade Name



**J.F. Pritchard & Co.**

**EQUIPMENT DIVISION**

Dept. No. 181

908 Grand Ave., Kansas City 6, Mo.

**REGISTERED  
QUALITY  
EQUIPMENT**

operating records show this system maintained a more constant system pressure over a long period of time than was possible under strictly manual control. Furthermore, a man hour saving of 75% was achieved. Previously, an attendant was required twenty-four hours a day, whereas under automatic control, this installation required an average of only four man hours a day to maintain, service and operate the equipment the first year. Experience indicates that such savings can be increased still more.

As can be seen from the foregoing applications, the use of automatic controls provides two outstanding advantages. First, it reduces the labor cost by almost eliminating the engine attendant. Second, the efficiency of the installation is greatly increased by the elimination of the human element in times of emergency and actual absence of the attendant from the job. Increased production, minimum overhead and top efficiency in operation are the three factors no superintendent can overlook. Automatic controls for engines have proven themselves to have these three basic factors of modern productivity.

### New Motor Graders

Two completely new motor graders—models AD-40 and AD-30—were announced recently by the Tractor Division of Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin. These newly designed machines complete a line of five motor graders having a wide range of horsepower, weight and speed. They are embodied with design and construction features which offer new standards of performance, greater operating ease and complete simplicity. The 4 cylinder, 2-cycle, diesel engine AD-40 weighs 23,000 pounds and develops 104 brake horsepower. The AD-30 is powered by a 3 cylinder 2-cycle diesel engine, weighs 22,700 pounds and develops 78 brake horsepower. One of the most modern graders ever introduced, the Allis-Chalmers model AD's are big and rugged. They will easily and quickly handle the toughest grading or maintenance jobs. Engineered for high production on any operation, the model AD's include many features. The General Motors 2-cycle diesel engine can easily handle the heavy-duty power requirements of any job. Tandem drive offers full traction under any ground conditions.

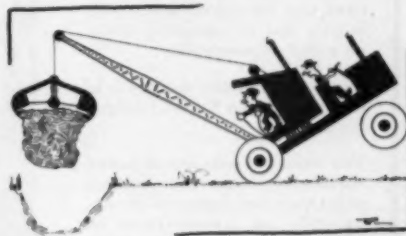
High axle clearances, the famous Roll-Away moldboard and accurate blade control all combine to move bigger loads, produce precision cuts or smooth finishes on a wide variety of applications, construction or maintenance. New standards of operating ease, incorporated into the AD motor graders, include easier shifting, complete visibility, feather-touch hydraulically-operated steering and all around operator comfort. Completely enclosed in the main frame, a trouble-free hydraulic booster system provides effortless steering even in the toughest kinds of work. Accessibility to major assemblies, for service or repair, is an important feature in the new AD motor graders. Accessories and special equipment are available for the AD motor graders to increase their adaptability to meet a wider variety of specialized applications and conditions. Additional information on the new AD-40 and AD-30 motor graders can be obtained by con-

tacting your nearest Allis-Chalmers industrial dealer or Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin.

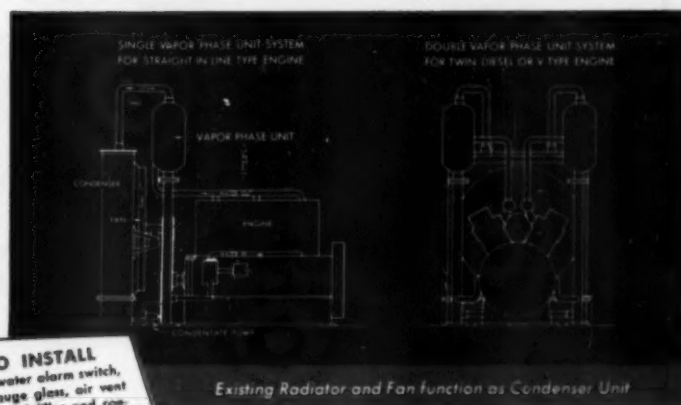
### Names New Sales Manager

Herman T. Robbins has been named as sales manager of the Generator Set Division of John Reiner & Company, Long Island City, N.Y., according to an announcement made by John Merk, general manager of the company. The Generator Set Division handles the distribution and sales of D. W. Onan generator sets as well as the John Reiner & Company line of diesel and gasoline generator sets, marine division auxiliaries and oil field utility units. In addition to his regular duties, Mr. Rob-

bins will also be in charge of all the export activities of the company. He will travel extensively in this country and abroad to survey market conditions and seek additional domestic dealer and export distributor outlets.



## VAPOR PHASE *Economy Kit*



**★ READY TO INSTALL**  
Complete with low water alarm switch, pressure gauge, gauge glass, air vent vacuum breaker, hand filler and condensate pump with belt and pulleys.

### SERVING INDIVIDUAL ENGINES OF 50 TO 350 HP

TO MEET THE DEMAND for a trouble-free engine cooling system of highest efficiency and low cost—a system that any mechanic can easily install—this time-tested Vapor Phase Package Kit is offered.

Designed for individual engines of 50 to 350 HP, countless units are serving old and new engines powering drilling and hoisting rigs, pipeline pumps and other power generating units in a wide range of industrial and commercial operations.

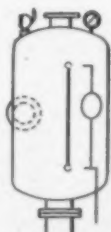
VAPOR PHASE eliminates the troublesome, costly disadvantages of conventional engine cooling. Bear in mind, "an engine performs in direct relation to the quality and efficiency of its cooling system."

VAPOR PHASE Cooling provides constant peak performance, regardless of load or conditions. The engine "takes it" from idle to instant full load, or sudden load changes, without power loss or detriment.

Absence of condensation and combustion residues in the cylinders is assured with Vapor Phase. Corrosion, sludging, wear, scaling, rust and leaks—all are reduced to an extreme minimum.

Exceptional fuel and maintenance savings accrue. Low grade or ordinarily destructive acid type fuels can be used safely. Break-downs and repairs are rare!

Vapor Phase functions automatically—



VAPOR PHASE equipped engines also serve to generate steam, heat fluids, space or other process, and cool air conditioning—each as required or all at the same time.

### AND ALL IT COSTS IS FUEL FOR THE ENGINE!

Kit sizes available for any 50 to 350 HP Diesel, Gasoline or Gas engine.

**VAPOR PHASE** pays off in Savings alone, the first year. The unit costs nothing to operate and is good for life.



WRITE OR WIRE FOR INFORMATION.

Offices in Most Principal Cities

**ENGINEERING CONTROLS, Inc.**  
2835 East Eleventh St., Los Angeles 23



## DIESELS for operating ECONOMY

The present day trend toward diesels — both for new installations and for replacements — is largely due to operating economy and dependability.

Current installation practice is to mount them on Korfund Vibro-Isolators.

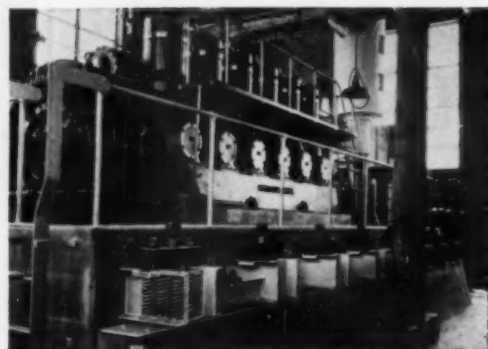
This makes it possible to install diesels anywhere with positive assurance that there will be absolutely no transmission of objectionable vibration. Additional benefits include savings from reduction of building and engine maintenance costs, and frequently the elimination of concrete foundations.

Vibration is absorbed by steel springs which provide the finest isolating medium available. Thrusts are controlled by resilient chocks in the four corners.

The result is smoothed, floating operation at all speeds — in marine, mobile, or stationary installations. The cost is low. Ask for Bulletin G-104. Representatives in principal cities.

**The Korfund Company, Inc.**

48-208 32nd Place, Long Island City 1, N. Y.



Fairbanks-Morse 450-hp. Unit at Floyd Bennett Field, Brooklyn, N. Y. Foundation located above ground because of high water table. Four Korfund isolated Nordberg 1425-hp. units were recently installed by Bangor Hydro-Electric Co., in Maine.

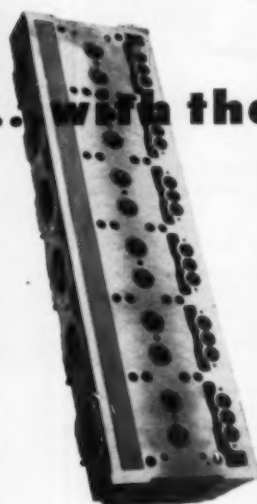
### A Few Typical Installations:

Bangor Hydro-Electric Co., Bangor, Me.	4 1425-hp. Nordberg
Lenox Hill Hospital, New York	1 750-hp. Worthington
2 Park Avenue, New York	4 450-hp.; 1 750-hp. Worthington
New Yorker Hotel, New York	1 550-hp.; 1 750-hp. Bosch-Sulzer
Humm Department Store, Brooklyn	4 300-hp.; 1 180-hp.; 1 150-hp. Worthington
Macy's, New York	1 700-hp. Alfa
Floyd Bennett Field, New York	1 450-hp. Fairbanks-Morse
Prudential Insurance Co., Newark, N. J.	1 740-hp. Baldwin
Loose Star Gas Co., Dallas, Texas	1 400-hp. Cooper-Bessmer (Gor)
San Oil Co., Caracas, Vene.	4 250-hp. Ingersoll-Rand (Gor)
Cia Central Argentina De Electricidad, Buenos Aires, S. A.	1 270-hp. Sulzer; 3 540-hp.; 1 540-hp.; 1 700-hp. Deutz

## KORFUND for operating SMOOTHNESS

# Rebuilt diesel castings.. with the

# Guth FUSION\* PROCESS



Save yourself costly shut-downs. Save the expense of new castings. Send broken diesel heads, blocks, and castings to Guth for renewal by the Guth fusion process backed by 25 years of successful experience. Ask any Guth user or send today for illustrated catalog.

Dealerships available, write today for complete information.

\* A specialized system of reconstructing damaged or worn castings to new or better-than-new condition conforming with latest factory specifications . . . fully guaranteed.

**GUTH COMPANY**  
McPHERSON, KANSAS



WRITE FOR ADDRESS OF NEAREST DEALER

## Joins Staff



J. L. Utter

The Wix Cooler Company of Seattle, Washington has announced a new firm membership. Jack L. Utter, a graduate engineer with many years of valuable experience, has joined the staff of the Wix Cooler Company. Formerly a division engineer for General Electric at the Hanford Atomic Energy Plant, Mr. Utter will assist John Weeks, chief engineer of Wix Cooler. The company also announced the following manufacturer's representatives: Hopkins Engineering Company of Detroit, Harry E. Carlsen of Washington, D.C., and Correct Craft, Inc. of Titusville, Florida. R. T. Puelicher of Pasadena, California and the J. B. Hickman Company of Seattle continue as the company representatives in their respective territories.

## Expands Diesel Locomotive Shop Facilities

The Luria Engineering Corp. in February will begin construction for the New York Central Railroad at Minoa, N.Y., of the fourth of a series of diesel locomotive service and repair shops which, when completed next summer, will mean another 2,500,000 cubic feet of facilities in the railroad's current dieselization program, according to an announcement here by B. H. Tripp, executive vice president of Luria, which designs and builds standardized steel-frame structures for industry. The projected shop, which will cover 48,800 square feet, will be the largest in the series of units specially designed to inspect, service and repair the system's diesel locomotives, Mr. Trip said. Upon completion, the four single-roof shops will cover an area totaling 130,400 square feet, he pointed out.

The steel structure of the Minoa shop, like the others in the series, will be fabricated at Luria's plant in Bethlehem, Pa., and then shipped to location for erection. A single-story building, with a two-story attachment for offices and warehouse, it is expected to go into operation next fall equipped with two 72-foot span overhead crane runways, drop tables, retractable platforms and operating platforms at various levels. The shop will be designed to handle 30-ton and 5-ton overhead cranes.

The first of the diesel locomotive shops for New York Central, with an area of 2,800 square feet and facilities occupying 48,800 cubic feet, was completed by Luria at Corning, N. Y., in October, 1950, and went into operation the following January. The second structure, which is at Rochester, N.Y., was completed last summer and is expected to be ready for operation next March. It covers 4,800 square feet and will have facilities occupying 129,600 cubic feet. The building of the third shop, at Watertown, N.Y., is expected to be completed by the end of January and to be ready for operation this spring. It will have a 40-foot span overhead crane runway, equipment for 15-ton cranes and be capable of servicing six diesel locomotives at one time. Its area will be 5,600 square feet, with facilities occupying 150,000 cubic feet.

DIESEL PROGRESS

## Florida Diesel News

By E. F. DENNIS

REPOWERED with Cooper-Bessemer model JS8-770 hp., the 90 ft. tug *Battler* of Port Everglades is used coast wise. Diesel Sales Company of Miami sold the engines.

BARACOA, CUBA: the MV *Vergemere III* re-powered with a Superior model MRA 6-20 x 23 Columbia props, 2:1 Snow Nabstedt reduction gears, Pelaye Simon, owner. Supplied by Auto Marine Engineers of Miami.

KEY WEST, the *Vanda* changed from a shrimper to a pleasure craft while being built at Miami Shipbuilding Corp., Miami; Snow Nabstedt 3:1 reduction gears, owned by Col. A. E. Pierce. The Caterpillar diesel D1300 supplied by Shelley Tractor of Miami.

CHRIPOULA, a Tarpon Springs sponge boat, re-powered with a Superior model MRD 6-170 hp. at 1500 rpm., Groco cooling system, 2:1 Snow Nabstedt reduction gears, twin disc power "take off" owner and Captain Petros Falolites; supplied and engineered by Auto Marine Engineers of Miami.

PORT EVERGLADES: the tug *Hoosier State*, 75 x 16, GM 268A, 500 hp. main engine and Witte 5 kw., 32 volt generating set. Capt. H. C. Nickerson, owner; re-powered by Diesel Engine Sales Co. of Miami.

"BELIEVE IT OR NOT" Bob Ripley featured this Cummins diesel. A very interesting car is the 1936 Cadillac owned by Ed Parkinson of Cummins Diesel of Florida as it sports under the hood the only 100 hp. Cummins diesel in a car. Mr. Cummins himself installed it at the factory in Columbus, Indiana. This car is used every day and the average fuel consumption is less than one third of the original gasoline engine. During this long test period the cylinder head was only removed once for inspection and no repairs or adjustments have been needed to keep this top professional secret going day in and day out.

ALL SHIPPING interests in Greater Miami united to form a Chapter of the National Defense Transportation Association to insure cooperation in a crisis that would require the movement of men, munitions and materials to any point. Capt. Charles A. Olsen was elected temporary president. Vice Adm. Telfair Knight, U.S.M.S. ret., worked out the details of the preliminary organization.

A CATERPILLAR model D318 with a twin disc 3:1 reduction gear for the 64 ft. *Pastime II* used in conjunction with a Caterpillar model 3400, 28 hp. trawling engine. This small "Cat" has run 28,000 hours with only minor adjustments. Owner and Capt. M. C. Albury. Roth White Trading Co. of Miami supplied the engine.

TWO GIANT generating units mounted on 74 foot flat cars recently added to the mobile power plant fleet by Florida Power and Light Co. According to Cleveland Diesel Division of General Motors each unit is a "G.M. 16-367" 750 kw. Each unit when completed will include transformers, switch-

boards, fuel tanks and living quarters and will augment the fleet of 9 smaller units mounted on trailers.

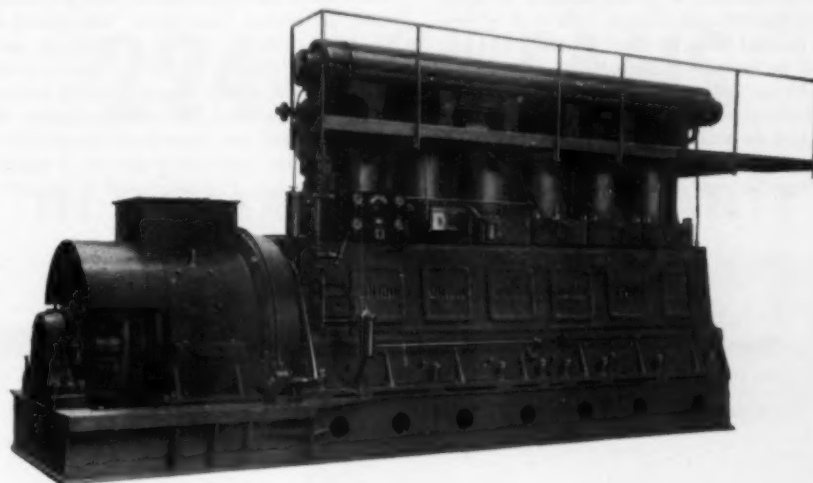
TUG *VIRGINIA B.*, one of Miami's mighty mid-gets, owned by the Belcher Towing Co., towing the barge Belcher #14, capacity 4200 barrels of gasoline, from Port Everglades. Cummins 150 hp. on the *Virginia B* and a Caterpillar D3400 with a Viking 6-inch pump on the barge.

MIAMI SHIPBUILDING CORP. seems to be the busiest yard in South Florida, with over 15 ships and boats ranging from the *Allens Cay* of Nassau, N.P. having her two Gray diesels overhauled and the *Sis* from Chicago, to the *Toussaint L'Overture*

of Haitian Coast Guard with her 2-1200 hp. pancake G.M.'s.

LISS Equipment of Miami have moved to a larger shop and offices where the combined area exceeds 27,000 sq. ft. This expansion was needed because of the increasing demand for construction equipment in Central and South America. Among their recent shipments were 2 T.D. 18 International tractors to Manuel Gonzales, Havana, Cuba.

FOR PORT AU PRINCE, Haiti, H.T.&E. Company, two Caterpillar road graders. To the West India General Store Ltd., Inagua, Bahamas, 1 D6 Caterpillar tractor and one road grader from Peoria, Ill.



**UNION**, in 1885, built the world's first successful liquid-fueled internal combustion engine • The **UNION** airplane engine was the first to meet endurance requirements of the United States Aeronautics Testing Laboratory • A **UNION** was the first American-manufactured, exhaust-gas, supercharged, heavy-duty Diesel engine • **UNION** Dual Fuel Engines are used where simplicity, dependability and economy are paramount • Two **UNION** engines and an assembly which illustrate outstanding developments are on exhibit at the Smithsonian Institution in Washington, D. C.

*Only UNION has been manufacturing quality internal combustion engines for more than 66 years*

# UNION DIESEL

2121 DIESEL STREET, OAKLAND 6, CALIFORNIA, U.S.A.

## G-M Expands in Miami



John Huglen, manager of the Miami branch of Cleveland Diesel Division of G.M., announces another expansion in its shop facilities. With this added space of approximately 11,70 sq. ft. of open and enclosed shops, they will be able to take care of all the service work needed and give more time to sales too. The new shop, when completed, along with the present shops, docks, ways, and offices will give the Miami branch one of the largest and finest facilities for a diesel distributor in Florida. It covers an area of approximately  $5\frac{1}{2}$  acres of

which 460 ft. are on the Miami River and also includes a boat slip of 240 x 78 ft. which is deep enough to handle boats up to 10 ft. draft and an 80 ft. marine railway which can handle boats up to 100 tons.



The repair shops have a complete set-up for testing small and medium sized engines. Test loading is provided by a 75 kw., 125 volt, dc., 1200 rpm. generator and a 700 bhp. dynamometer, both of which dissipate their power through portable resistor boxes. The combined floor space including the office, shops and parts department exceeds 22,000 sq. ft. and they have enough grounds to expand several times over. This branch with its competent

staff of over 20 persons, handles both the Cleveland and Detroit Division diesel engines for So. Florida and the Caribbean area. It is a far cry from 20 years ago when John Huglen carried the Company's business around in the sweat band of his hat and had the parts department in his garage. It is his dream come true.

## Catalog Issued

New 76-page catalog of The Parker Appliance Co., Cleveland, combines in a single volume complete data on tube fittings and tube-to-pipe adapters, fabricating equipment, and pertinent data on engineering selection and installation. Photos, drawings, and dimensional tables are included for all shapes of the Triple-lok standard 3-piece flared fitting in brass, aluminum, steel, and stainless; the Ferulok flareless fitting in steel; precision machined pipe fittings, and tubing, tube clips, tube cutters, benders, and flaring tools. The data section includes six pages of "How-to-do-it" photos and eight pages of valuable selection charts relating tube size to such variables as velocity and flow, differing service conditions, allowable stress, temperatures, and pressures.



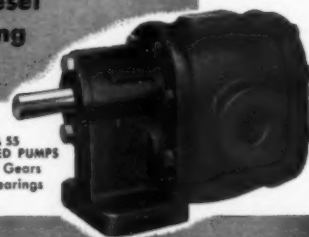
• You'll find Reiner units like this combination diesel-driven generator, compressor and pump serving on many marine service boats. They meet the standards for compactness, dependability and efficiency this duty calls for with flying colors.

Whatever your auxiliary power needs may be—wherever you need them—look to Reiner for the answer.



## These Diesel Lubricating Pumps

Nos. 53 & 55  
ROTARY GEARED PUMPS  
with Helical Gears  
and Roller Bearings



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HERE ARE exceptionally long-lived, efficient pumps for your diesel's pressure lubricating system up to 200 p.s.i. Nos. 53 & 55 Brown & Sharpe Rotary Geared Pumps have very accurate helical gears and roller bearings... provide smooth flow at high speeds. Leakage is prevented by mechanical seal... no glands to wear out. Their long, trouble-free performance is proved in thousands of diesel installations. Available with capacities from 4 to 34.1 g.p.m. at 0 lbs. pressure. Write for complete Pump Catalog. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

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## Increased Demand Anticipated



V. C. Genn

The development of smaller, lighter weight diesel engines in the last decade is largely responsible for today's nation-wide trend toward the increased use of diesels in many types of military and commercial applications. This is reflected in an announcement by V. C. Genn, general sales manager of the Detroit Diesel Engine Division of General Motors, that the Detroit Division has produced more diesel engines in 1951 than in any previous post-war year. Mr. Genn said that since the Division introduced its smaller two-cycle diesel engine in 1938 it had produced over 50,000,000 diesel horsepower. Citing greater portability as one important factor in the present widespread acceptance of diesels, Mr. Genn stated the sales of dieselized trucks had increased ten fold in the last ten years. Similar gains have been registered in many other lines where portability is a factor. These Mr. Genn listed as construction, earthmoving, oil well drilling, lumbering and commercial fishing.

## Launched Eight New River Boats



The Towboat *Vesta* pushes 7500 tons of coal for Jones & Laughlin Steel Corp. It is one of eight identical vessels built for Pittsburgh operators.

Launching of eight new river towboats highlighted the 1951 inland waterways shipbuilding activities of Dravo Corporation, the Pittsburgh company announced in a year-end report. The eight new vessels—seven of them built on an assembly line basis—were among a gross of 49,376 tons launched during 1951 by Dravo at its Wilmington, Del. and Pittsburgh shipyards. All of the towboats are modern diesel-powered craft. The seven "assembly-line" boats were designed primarily for transporting coal from mines to steel mills, power plants and other vital defense production industries in the Pittsburgh district. In most cases, the 108-foot, screw-propelled towboats replaced steam paddle-wheel vessels.

## Late Governor Design

An improved locomotive governor which has been installed on Alco-GE 1600-hp. road locomotives

for the past year may now be installed on earlier model locomotives through the use of an adapter kit. The latest model governor, engineers of General Electric and American Locomotive Co. point out, is high-lighted by simplified electrical components and fewer moving parts. The new governor is the result of an evolutionary design improvement gained in millions of miles of operation with earlier designs. Nearly all expendable parts of the new governor are completely interchangeable with corresponding parts of the former design. The speed pilot valve and the fuel limit pilot valve have been made identical in design so that separate renewal parts stocks are no longer necessary. The valves may now be removed from the top of the governor as a unit. External piping has been re-

duced by building the oil reservoir into the base of the unit, thus eliminating the separate oil reservoir formerly mounted on the floor of the locomotive. A visible reservoir sight glass replaces the old dipstick method of checking oil. Electrical wiring has been simplified through the elimination of the governor-off switch, its function being served by another switch in the circuit.

**DIESEL ENGINE CATALOG** is now available in its Sixteenth expanded edition. Completely revised and re-edited, it is an invaluable aid to design engineers and buyers. Fully illustrated. \$10.00. Order now from **DIESEL PROGRESS**, P.O. Box 8458, Cole Station, Los Angeles 46, California.

# 224 "Buffalo" FANS

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**FOR DIESEL SCAVENGING**, the blowers illustrated here.

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**SMALL SPACE REQUIREMENTS!** Above, note how compactly this "Buffalo" blower fits in with radial Diesel installation.

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**EVAPORATIVE COOLERS AND AXIAL FLOW FANS FOR COOLING MOBILE AND STATIONARY DIESELS**

## Inland River Reports

By DAVID I. DAY

ALL ALONG the Illinois Waterway, the folks are planning to turn out to see at work the new diesel vessel, *City of Joliet*, built by the Jeffersonville Boat & Machine Co., Jeffersonville, Ind. She is listed as No. 14 in the active fleet of the American Barge Line. Retractable pilot house to get under the low bridges in the Chicago area and the Kort Nozzles are features, and in the engine room are twin Washington diesels, totaling 1200 hp.

WE WERE delighted in December to see the M.V. *Patsy Chotin* headed far up the Ohio River push-

ing two barges of oil. The officials stated that the boat had been only ten days out of Houston, Tex., and was holding to her fast time despite water a trifle high. Capt. Floyd Timmons was in charge. This boat is owned by the Chotin interests of New Orleans and was built a year or two ago at the Nashville Bridge Company yards. She is 116 feet long and powered (2000 hp.) by twin General Motors diesel engines.

THE M.V. *DeSoto*, a January launching at the yards of St. Louis Shipbuilding & Steel, is a beauty, 116 x 30 with a normal draft of 7½ feet. She is powered by twin General Motors (Cleveland) diesels, totaling 1800 hp. For the winter she will push petroleum products on the lower Mississippi but

with the spring thaw on the upper river she will be in the New Orleans-St. Paul oil trade.

THE NEW *B. F. Fairless* recently completed by the Dravo yards is at work in the coal trade in the Pittsburgh area for her owners, the United States Steel Co. As a result of the completion of the boat, the old steamer *Clairton* is being dismantled. Eventually the steel company's fleet will be all diesel. The *Fairless* is 108 feet long and has two Superior diesel engines, totaling 1066 hp. We got out first look at this excellent towboat recently on the Monongahela River taking coal to the steel company's coke plant at Clairton, Pa., largest coking installation in the world.

ANOTHER RIVER towing outfit rapidly converting to the exclusive use of diesel is O. F. Shearer & Sons. The firm has only one steamer left. Last month, the *O. F. Shearer* (the old steamer *Victory* of Pittsburgh) was dismantled and what remains is used as a welding shop and storage quarters for the company at Cedar Grove on the Kanawha River. The company operates the motor vessels *Duncan Bruce* (twin Superiors, 1350 hp.), the *Geo. T. Price* (twin Superiors, 1600 hp.), and the *Walter P. Dolle* (twin Superiors, 520 hp.)

THE *MARCO* ended the upper Mississippi towing season in mid-December having to fight her way through the ice. The day after we saw her through the locks at Keokuk, Iowa, the government men started "de-watering." This fine 2000 hp. diesel vessel was originally the *Progress* of the American Barge Line. She is now the property of Martin Oil Service, Inc. She is powered with twin Cooper-Bessemer.

EDWIN T. BULL of the Bull Towing Company, Joliet, Ill., was much elated recently to see radar installed on his *Bull Durham*. Also installed was one of Capt. Bull's own devices for the raising and lowering of radar antennae—installed on a towboat for the first time. The *Bull Durham* is a Nashville Bridge boat deriving 1200 hp. from twin Caterpillar diesels.

PUSHING PETROLEUM products up from Gulf Coast ports to the Illinois River terminals is the brand-new *Coal King* of the Mid-Continent Barge Line, recently completed at the Alexander Shipyards at New Orleans. The boat is 118 x 35 x 11 feet and is powered by two 900-hp. General Motors (Cleveland) diesels. With the opening of navigation next spring on the upper Mississippi the boat will push both coal and oil to St. Paul and Minneapolis.

IN ADDITION to the thousands of automobiles going down the rivers this winter, other thousands of army vehicles are heading down toward Dixie—trucks, half-trucks, and jeeps. While the special carrier boats of the Commercial Barge Line are handling most of these vehicles, other boats are picking up extra money in this business. We saw recently two oil boats carrying army "rolling stock"—the *White Gold* and the *Lin Smith*. The former is one of the best of a long list of General Motors powered boats, around 1600 hp. The latter is propelled by Cooper-Bessemer power, fully 3000 hp.



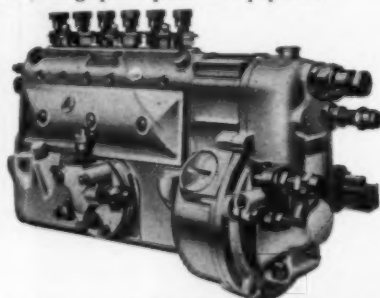
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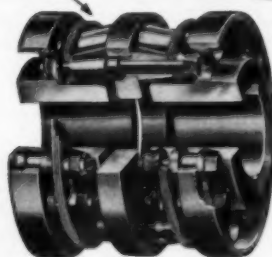
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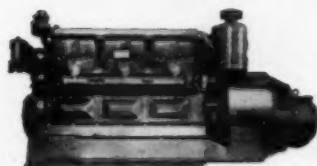
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AUXILIARY DRIVES, ETC.**

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**THOMAS FLEXIBLE  
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## NEW CAMSHAFT BEARING

It was claimed by many, back in 1946, that camshaft bearings could never be sold as a single line, without having main and connecting rod bearings as companion items. Not only has the Dura-Bond Bearing Company, Palo Alto, California, disproved that idea, but the Company has also managed to secure a large share of national cam bearing business as well. Specializing solely in camshaft bearings, Dura-Bond is currently enjoying a unit sale in excess of two million a year, with sales increasing steadily. The Company's bearing differs somewhat from the usual split and interlock types, a fact that accounts in part for the rise to national stature in just four years.

In 1946, Jack M. Fowle, Dura-Bond president, concluded that cam bearings then being manufactured as replacement items were not meeting the high requirements of modern engines. His company, accordingly, engineered the "all around," or precision cam bearing manufactured from steel tubing instead of the customary flat steel sheets. Having no split to create tolerance distortion, the "all around" is the only true round cam bearing on the market.

Sales were slow at first, since it was not easy to overcome the prejudice against a single line of bearings. Gradually, however, mechanics and maintenance personnel came to appreciate the several advantages of precision: faster and easier installation, better performance, and economy (considering that less time is required for installation, and that ease of installation virtually eliminates the danger of damage during insertion into the block).

Once the advantages of the "all around" had been made known to the trade, the next sales step was to demonstrate conclusively the need for more frequent replacement. The company showed, for instance, that failure to replace is a major cause of breakdown in rebuilt or overhauled engines. Since the worn cam bearing seriously impairs proper oil distribution, resulting in starvation of both main and connecting rod bearings. Partially as a result of such educational, or "missionary" work, total yearly replacements have risen considerably, 40% in the fleet field alone.

The fact that Dura-Bond is now selling more than two million "all around" bearings a year demonstrates that both "precision" and "importance of replacement" have taken hold and are paying dividends, and that specialization in a single line can be definitely successful.

Jack M. Fowle, founder and president of the Dura-Bond Bearing Company, is noted for his important contributions to the diesel field. While chief engineer, diesel division of the Joshua Hendy Iron Works (1942-1946), he designed and developed the Hendy diesel engines for auxiliaries, Models 20 and 50, that have proved so successful throughout the world in the ships of the U.S. Maritime Commission.

Before joining Joshua Hendy, he was development engineer for the Atlas Imperial Diesel Engine Com-




Jack M. Fowle

pany for 12 years. He had previously been connected with the Hall Scott Company, Berkeley, California. He received his B.A. from Stanford University in 1930.

Assisting Mr. Fowle at Dura-Bond is chief engineer I. Nash, also well known in the diesel world. Prior to the formation of the Dura-Bond Company in 1946, Mr. Nash was with the Caterpillar Tractor Company, Joshua Hendy Iron Works, and the Enterprise Diesel Engine Company.

Dura-Bond has recently published a new cam bearing catalog, listing virtually all numbers for 131 engines, with many diesels included. This catalog, together with other information, may be obtained from the Dura-Bond Bearing Company, 715 Loma Verde, Palo Alto, California.





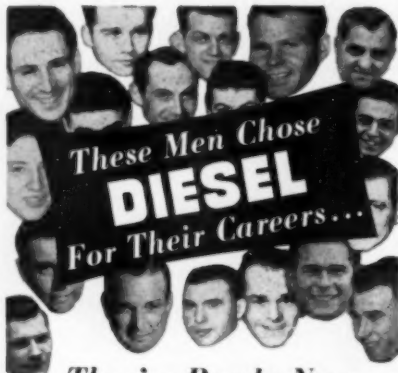
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### Fairbanks-Morse Personnel Changes

Changes in the Fairbanks-Morse sales organization as announced recently by Robert H. Morse, Jr., president, are as follows:



J. A. Cuneo, formerly manager of the Chicago branch has been promoted to the position of general sales manager.

C. E. Dietle, formerly diesel department manager of the Chicago branch, has been promoted to the position of manager of the Diesel Sales Division.



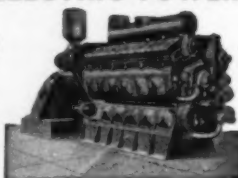
J. W. Wright, formerly manager of the Diesel Sales Division, with headquarters in Chicago, has been appointed manager of the Omaha branch.

Milo C. Roy, formerly manager of the Omaha branch, has been appointed manager of the Chicago branch.



### DIESEL ELECTRIC POWER for IMMEDIATE SHIPMENT

Unit Capacities  
10 to 1875 Kva  
A.C. 50-60  
Cycles  
Various  
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Write or wire today for bulletins and complete information regarding these fine fully guaranteed, low cost DIESEL ENGINE GENERATING UNITS. Visit our plants at Sausalito (S. F.), California, and Jersey City, N. J., and see units in operation on our test stand.

"SPECIALISTS IN DIESEL POWER"  
**A. G. Schoonmaker Co., Inc.**  
54 Church St., New York 7, N. Y.



L. A. Weom, formerly manager of the St. Louis branch, has been transferred to St. Paul where he has taken the duties of branch manager succeeding A. C. Thompson who has retired after forty-five years of service.

Clifford J. Schroeder, formerly Diesel Department manager of the St. Louis branch has been promoted to manager of the same branch succeeding L. A. Weom.



W. B. Wyll, formerly manager of the Houston, Texas sub-branch, has been appointed manager of the Atlanta branch.

H. L. Hilleary will continue as assistant sales manager of the Chicago branch. O. O. Lewis is vice president in charge of sales for the company. Mr. Morse also announced an autonomous operation for two of the company's divisions, Electrical and Scale.

### Association Formed

A new trade organization of national scope, to be known as the Association of Bearing Specialists, has been incorporated under the laws of the State of Illinois, it was announced by William F. Chase, president, Bearing Service Company, Pittsburgh, who has been named chairman of the board of the new association. The organization's first meeting was held late last year.



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Units do the job  
Better, Faster,  
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## Sales Representative



Harry King

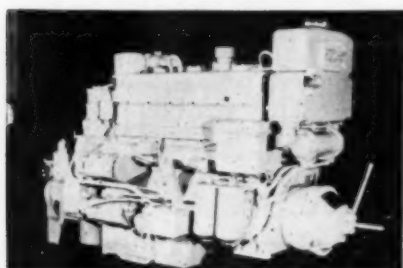
The Marquette Metal Products Co., Cleveland, manufacturer of the well known Marquette roller bearing spindle with full-floating footstep bearing, announces the appointment of Harry King as sales representative in South Carolina. Mr. King is located in Greenville.

He is a graduate of Clemson College, and has been identified with the textile industry in the southern states for several years.

## Named to Allis-Chalmers Post

William M. Wallace has been appointed an assistant to the vice president of Allis-Chalmers general machinery division, according to an announcement by J. L. Singleton, general machinery division vice president. Since 1947, Mr. Wallace has been special assistant to G. V. Woody, manager of the company's processing machinery department. He entered Allis-Chalmers employ in 1937 after graduation as a mechanical engineer from Alabama Polytechnic Institute. He was a sales representative in the Denver and Pittsburgh district offices before entering the processing machinery department. In 1951 he received a master's degree in business and engineering administration from Massachusetts Institute of Technology following a year of study under a Sloan fellowship. Announcement is also made of the appointment of Elvin R. Danielson as supervisor of priorities succeeding the late Robert T. Ward. Mr. Danielson in his new post reports to Mr. Wallace.

## Exhibited at Motor Boat Show



The Caterpillar D337 marine diesel.

Three "Cat" marine diesels were exhibited at the 42nd National Motor Boat Show in New York City, January 11-19. These engines included the large V-type D397 and D375, along with the presentation of the new "Cat" D337 marine diesel. With the showing of the D337 comes the announcement by Caterpillar that this new engine is now available. It is a six cylinder engine with 5 1/4-inch bore and 6-inch stroke, developing 170 continuous horsepower for marine applications. The D337 was described in the July 1951 issue of DIESEL PROGRESS. Together with the large V-type engines, the D337 helps round out a range of from 48 to 500 maximum horsepower for "Cat" marine engines.

## Fleet of Coal Haulers Delivered



In keeping with the special emphasis placed on increased production in all industries, the Dick Construction Company of West Virginia has recently put into service seven new Sterling-White coal haulers at their stripping operation near Clarksburg. These heavy duty units are Sterling-White model HB2755D six-wheelers, 179 inch wheelbase, powered with a 165 horsepower diesel engine. A four speed main transmission and three speed auxiliary provides twelve forward speeds and three speeds in reverse, resulting in an extremely wide overall gear ratio range and enabling the vehicles to negotiate with ease the 8% to 15% grades encountered in this operation. The tandem rear axle unit is of the double reduction type and tires are 12.00-24, 16 ply rating lug tread, single front and dual rear.

The chassis are equipped with special coal bodies of 25 cubic yards capacity with full cab protectors and heavy duty double telescopic hoists. A hy-

draulic power steering system increases steering ease and maneuverability thereby reducing the time required for spotting the unit under the shovel or moving into dumping position. Each unit operates two full shifts per day hauling average payloads of 18 to 20 tons per trip, a round trip averaging 2 to 6 miles depending upon the location of the loading equipment. Top speed in fourth overdrive at engine governed speed is 40 miles per hour, but due to the substantial payloads carried over numerous grades and unimproved roads, the average haul is made in direct-third at a speed of approximately 20 miles per hour. The many features included in these dieselized coal haulers which are "engineered for the job" and designed for the specialized service for which they are to be used, assure the Dick Construction Company of many years of efficient, economical and dependable service.

## Expansion Joint Design Guide

An illustrated catalog describing all types of corrugated expansion joints has just been released by Flexonics Corporation, formerly Chicago Metal Hose Corporation, Maywood, Illinois. This catalog gives complete specification and installation data for Flexonics-type free-flexing joints, for low pressure applications; controlled-flexing joints, for greater amounts of traverse; and Flexoniflex joints for extremely high pressure applications. Also covered are dual, hinged, balanced, and bulkhead units. For a copy write Flexonics Corporation, 1340 South Third Avenue, Maywood, Illinois, requesting catalog CMH-127.

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### New Marley Double-Flow Aquatower



The new Marley Double-Flow Aquatower is a water cooling tower for use wherever intermediate capacities of cold water are required. Cooling towers in this range are widely used in the power, petroleum, gas, chemical processing, food processing, and metalworking industries, and wherever air conditioning and refrigeration are used. The new tower combines the high efficiency of the patented Marley Double-Flow design with the compact simplicity of the well-known Marley Aquatower.

Outstanding features of the new tower are these:

- (1.) Its height (only 7½ ft. for the 150-ton unit) is lower than that of most cooling towers of similar capacity. The new tower detracts little or nothing from the appearance of buildings. On many buildings, parapet walls completely conceal the towers.
- (2.) Pumping head and required fan hp. are extremely low for any given capacity and design performance.
- (3.) It is one of the first water cooling towers in the "medium-capacity" range to use the patented Double-Flow principle—one fan utilizing air from two completely open sides. (This is the same design used in huge Marley Double-Flow towers that cool more gallons per minute than towers of any other design.)
- (4.) Tower weight is evenly distributed over a wider area than that of most cooling towers of similar capacity.
- (5.) Tower design simplifies maintenance and in-

spection. All parts—piping, nail-less redwood filling, basin fixtures, fan and motor, distribution basin—are readily accessible.

The new Marley Double-Flow Aquatower comes in seven standard sizes, starting with a 50-ton unit. It is available in all steel or wood with asbestos cement board casing. The tower is a new and exclusive product of The Marley Co., Inc., 222 W. Gregory Blvd., Kansas City 5, Mo.

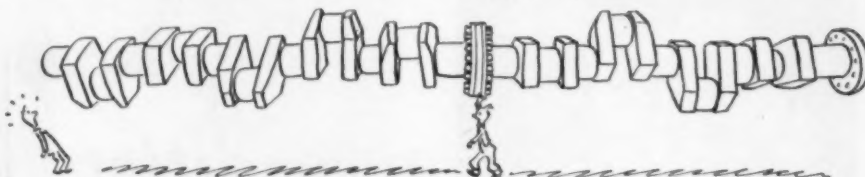
### Executive Personnel Shifted



Walter A. Gantner

F. Edward O'Neil, president of Fulton Iron Works Company since 1933, has been elected chairman of the board of directors of the organization. Mr. O'Neil, whose appointment fills the vacancy caused by the death of the late Mark C. Steinberg, has been with Fulton since 1902, serving as manager of the company's Havana and New York offices before becoming its president. Walter A. Gantner, former executive vice-president, was named to succeed Mr. O'Neil as president. Mr. Gantner has been associated with the company since 1920. He began his career in the engineering department and rose to production manager, vice president in charge of production, and executive vice president. Herbert A. Schuster, controller since 1946, was elected vice president and treasurer, and the appointments were completed with the naming of Harvey T. Bohley as secretary and assistant treasurer and Charles T. Herrmann as assistant secretary.

**DIESEL ENGINE CATALOG** is now available in its Sixteenth expanded edition. Completely revised and re-edited, it is an invaluable aid to design engineers and buyers. Fully illustrated. \$10.00. Order now from **DIESEL PROGRESS**, P.O. Box 8458, Cole Station, Los Angeles 46, California.



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DIESEL PROGRESS



## West Coast Diesel News

By FRED M. BURT

**PURCHASED BY** Anaconda Copper Co., for use at their new \$25,000,000 copper mining operation at Yerington, Nev., 30 Dart, heavy-duty, off-highway, pit trucks powered with 300-hp. Cummins diesel engines.

**FROM** Anderson-O'Brien Co., Los Angeles for standby power at C.B.S. television station KNXT on Mt. Wilson, twin 4-cyl., 200-hp. General Motors diesels driving an Electric Machinery 125-kw. generator, push-button starting, Delco-Remy starting motors, Bendix drive, UG-8 Woodward isochronous governor.

**FOR** KELLOGG DRILLING CO., of Compton, Calif. three 335-hp. @ 1200-rpm., Buda diesels to power drilling rig drawworks and mud pump operating in the La Habra field.

**DUE TO THE** success of the natural gas pressure maintenance program in California fields, Standard Oil Company of California and Union Oil Co. have placed orders for a total of 5,000-hp. of Clark gas-engine compressors to increase capacity at existing plants.

**FOR** NEW Phelps-Dodge copper-mining operation at Bisbee, now in over-burden removal stage, 15 heavy-duty Mack pit trucks powered with 300-hp. Cummins diesel engines.

**GENERATOR EQUIPMENT CO.**, Los Angeles, distributors for Kohler electric plants for the past 15 years, has received the first shipment of the new Kohler, 8-kw., 4-cyl., 20-hp. diesel-electric generating plants.

**RECENTLY INSTALLED** in Bakersfield (Calif.) sewage disposal plant for power, six 125-hp. Buda dual-fuel engines to operate principally on sewage gas; an Engineering Controls' Vapor Phase installation replaces radiators for engine cooling, also utilizing waste engine heat to produce low pressure steam used in sewage treatment.

**FROM** Engine Sales & Service, Los Angeles, a 3-cyl., 30-hp. Sheppard diesel driving a 15-kw. Kurz & Root generator for power and light at Don Flanagan's resort at Cadiz Summit, Calif.

**NEW DISTRIBUTOR** for Cummins diesel engines in busy Alberta territory is Cummins Diesel Sales of Alberta, Ltd., a subsidiary of the British Columbia organization headed by Fred Clark. The main office in Edmonton will be in charge of Fred Clark, Jr. There is also a branch at Calgary.

**FOR** STANDARD OIL wildcat drilling operation

near Glendale, Utah by Shamrock Drilling Co. of Long Beach, new General Motors diesels; four twin-six units of 300-hp. for drawworks and mud pump; two 30-kw. diesel-electric generating sets; and on the sand line, 3-cyl., 85-hp. engine with Twin Disc converter.

**FOR** SHELL CHEMICAL CO., new synthetic ammonia plant at Ventura, Calif., seven new Cooper-Bessemer gas engine powered compressors (three of 2,000-hp., two 660-hp., two 440-hp.).

**APPOINTED** to be direct factory representatives, Charles C. Lowe & Co., San Francisco will handle maintenance of Clark Bros. Co. diesel engines in marine service on the Pacific Coast.

**NORTH JONES**, well known to Southern California contractors through years of sales of industrial equipment and engines, has joined The Industrial Engine Service, Inc., 5315 Valley Blvd., Los Angeles, as junior partner. The company was recently appointed as exclusive distributors of Murphy diesels in the Los Angeles area.

**FROM** SMITH-BOOTH-USHER, Los Angeles, International distributors, for Price Construction Co., Santa Monica, a TD-9 crawler tractor powered with a 4-cyl., 41-hp. International Harvester diesel; equipped with a Hough dozer-loader, for use in excavating for a hospital in Ventura.

**FOR** HECTOR LUTTEROTH to provide power for irrigation pumps in his cotton plantation at Hermosillo, Sonora, Mexico, a 150-hp. Murphy diesel (from Engine Sales and Service, Los Angeles).

**FOR** Richfield Oil Co., in Long Beach oil field to power Kobe system oil pumping (13,600 gal. daily) 12 Minneapolis-Moline natural gas engines, equipped with Vapor Phase system, replacing radiators for cooling, and using waste heat to produce 2,500,000 btu./hr. in low pressure steam to heat the 20 API crude oil for pumping.

**IN** POST & SCOBIE ROADHOUSE, Valdez, Alaska on a 30-kw. Caterpillar diesel electric set used for garage, shop power and hotel lighting, an Engineering Controls Vapor Phase unit, recovers exhaust and water jacket waste heat to produce steam to heat water and supply a space heater; with low load at night, a 15-kw. immersion heater is used to build up load and maintain steam supply for space heating.

**FROM** ENGINE SALES and Service, Los Angeles, a 165-hp. Murphy diesel for Utah Construction Co., at Hermosillo, Sonora, Mexico, powering a Peerless pump to supply water in the future "Imperial Valley of Mexico."

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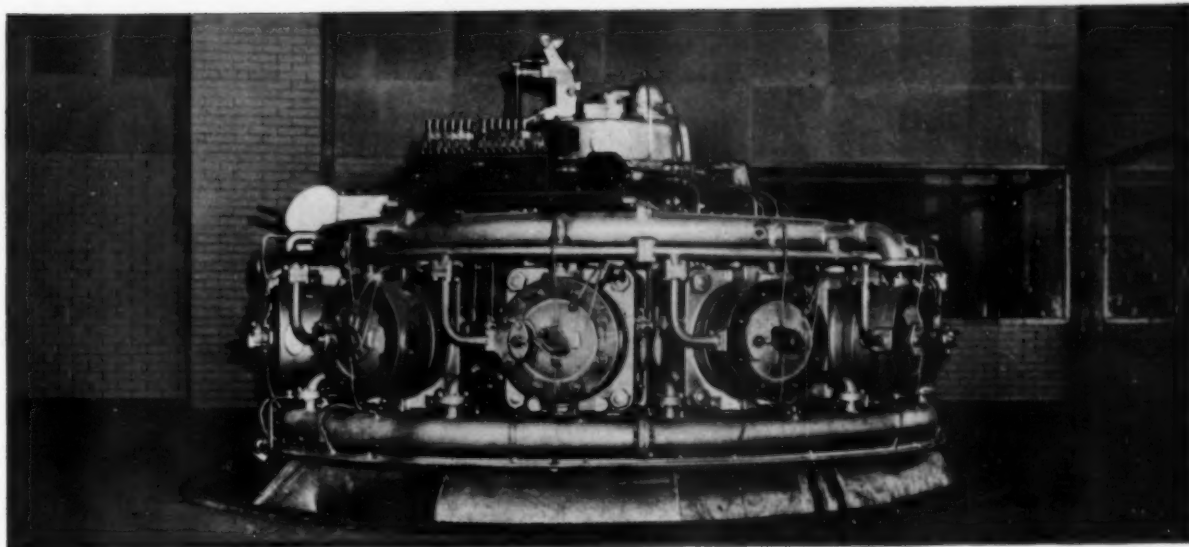


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## ADVERTISERS' INDEX

Adeco Products, Inc.	94	Korfund Company, Inc., The	86
Aerofin Corporation	92	Kurz & Root Co.	95
Aeroquip Corporation	18		
American Air Filter Co., Inc.	10	Madison-Kipp Corp.	2
American Bosch Corporation	29	Manzel	55
American Motors Co.	96	Marley Company, Inc., The	61
Atlantic Metal Hose Co., Inc.	77	Marquette Metal Products Co., The	25
		Merlin Engineering Co., Ltd., The	93
Baldwin-Lima-Hamilton Corp.	12-13	Metal Products Div., Koppers Co., Inc.	93
Brown & Sharpe Mfg. Co.	88		
Buda Company, The	3	National Supply Co., The	23
Buffalo Forge Company	89	Nordberg Mfg. Co.	24
		Nugent & Co., Inc., Wm. W.	65
C.A.V. Ltd.	90		
Cities Service Oil Co.	17	Petrometer Corp.	95
Cleveland Diesel Engine Div., General Motors Corp.	7	Photovolt Corp.	94
Columbia Electric Mfg. Co.	92	Pickering Governor Co., The	68
Cooper-Bessemer Corp.	Fourth Cover	Pritchard & Co., J. F.	84
DeLaval Separator Co., The	19	Read Standard Corporation	69
Delco-Remy Div., General Motors Corp.	32	Reiner & Company, John	88
		Rockford Clutch Div., Borg-Warner	76
Eaton Manufacturing Co.	78	Ross Heater & Mfg. Co., Inc.	63
Electric Auto-Lite Co., The	59		
Electric Machinery Mfg. Co.	22	Sarco Company, Inc.	95
Elliott Company	Third Cover	Schoonmaker Co., A. G.	92
Engineering Controls, Inc.	85	Sealed Power Corporation	30
Erie Bolt & Nut Co.	79	Sinclair Refining Co.	71
Erie Forge Co.	28	Standard Oil Co. of Calif.	5
		Standard Oil Co. (Indiana)	9
Federal-Mogul Corp.	26	Sterling Engine Co.	73
Fram Corporation	77	Sticht Co., Herman H.	95
Fulton Iron Works Co.	80	Sturtevant Co., P. A.	94
		Sweeney Company, B. K.	77
Gardner-Denver Company	8		
General Electric Co.	15	Texas Co., The	Second Cover-1
General Motors Corp. Cleveland Diesel Engine Div.	7	Thomas Flexible Coupling Co.	91
Delco-Remy Div.	32	Tuthill Pump Company	96
Gulf Oil Corp.	11	Twin Disc Clutch Co.	83
Guth Company	86		
		Union Diesel Engine Co.	87
Harnischfeger Corp., P & H Diesel Div.	20	United States Hoffman Machinery Corp.	81
Honan-Crane Corp.	74	Utilities Engineering Institute	92
Hunt-Spiller Manufacturing Corp.	4		
Illinois Testing Laboratories, Inc.	6	Van der Horst Corp. of America	82
International Harvester Co.	27	Vellumoid Co., The	95
Interstate Training Service	94		
Koppers, Co., Inc., Metal Prod. Div.	93	Westinghouse Electric Corp.	75
		Winslow Engineering Co.	72
		Worthington Pump and Machinery Corp.	21



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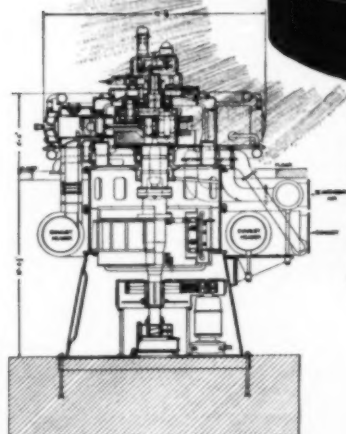
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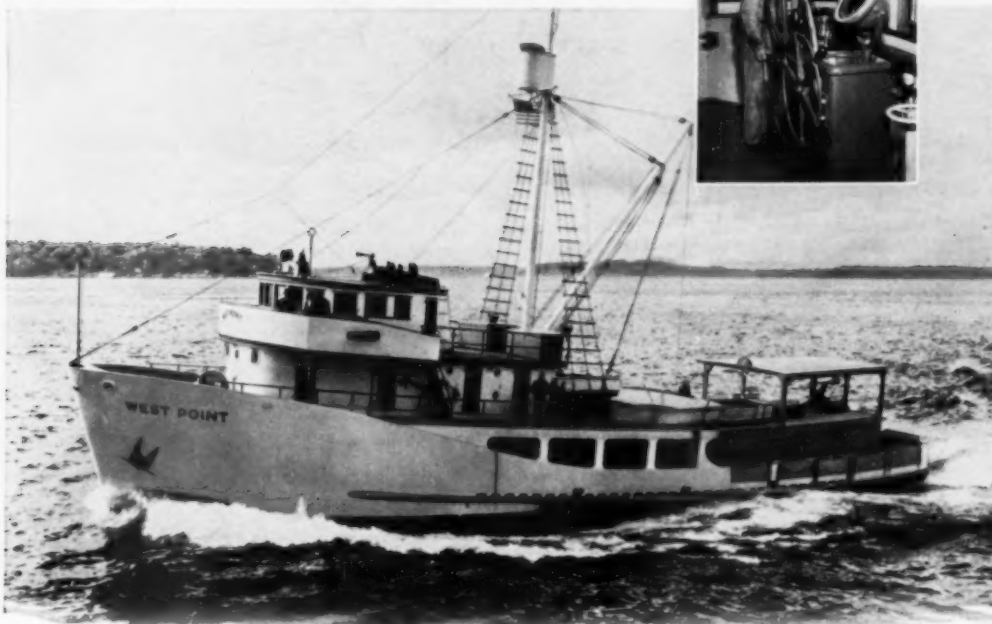


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